THE MODEL ENGINEER

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THE MODEL ENGINEER

EVERY THURSDAY

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Our Cover Picture

The importance of education in all its aspects is fully appreciated at the present time, and in addition to purely academical subjects, most educational authorities are devoting serious attention to handicraft training. In former years the treatment of this subject was inclined to be somewhat perfunctory, and hardly in touch with the requirements of modern industry; in fact, it may be said that in many technical and secondary schools the handicrafts section was regarded as a necessary evil rather than an integral and essential part of the training of pupils for their future career. It is a very hopeful sign of the times that the somewhat sketchy and definitely uninteresting course in basic wood and metal work which was once the rule is now giving place to much more comprehensive training in modern industrial methods, including the use of machine tools. Evidence of this is afforded in this picture submitted to us by Mr. D. H. Downie, of Witham, Essex, showing a pupil at work on a lathe at the Braintree Technical and Arts Institute.

SMOKE RINGS

Broad Horizons

AS THE scope of engineering in the industrial world increases, so does the realm of model engineering stretch further and further afield. Practically every new development or application of full-size engineering facilities is reflected in model activities, the variety of which is becoming greater every year. There was a time when the exhibits at a model engineering exhibition could be classified in a small number of well-defined groups, but at the present day no such clear-cut distinction is possible, and exhibition judges find that their tasks become more and more onerous, in comparing models so widely different in character and purpose that it is difficult to find a common denominator on which their decisions can be based. At this year's "M.E." Exhibition, for instance, there are many models of types which have never been seen before; to quote but a few examples, one competitor has modelled a "mole drainer," as used for drainage and reclamation of waterlogged soil; another has reproduced a mobile radar anti-aircraft unit, and yet another has entered a model of an ingenious appliance for drilling and tapping water mains, and fitting branch mains, while under pressure. Scientific instruments are also becoming more popular, including clocks of various types, and there are also an ever-increasing number of items of diverse type which can only be classified under the heading of "General Craftsmanship." It may, perhaps, be argued that these cannot truly be described as "model" engineering, or that they are at best borderline subjects; but the fact remains that they are the product of equipment, not to mention hands, which can be found in home workshops throughout the country, and as such they are definitely within the scope of the Exhibition. If "variety is the spice of life," one may be sure that model engineering, in all its branches, is very much alive!

Model Nostalgia

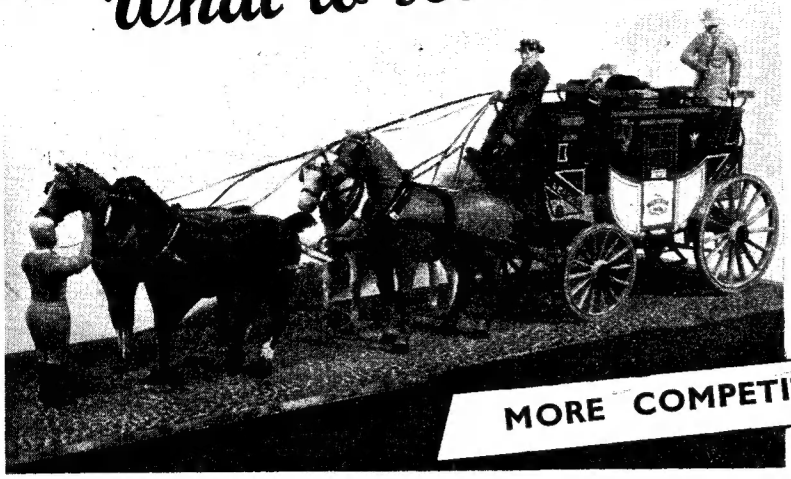
A FRIEND of ours once remarked that one of the less obvious joys of visiting the "M.E." Exhibition is that it brings back a flood of memories, most of them pleasant, of scenes, impressions and events of one's youth. The same idea is evident, though perhaps less coherently expressed, by the comments of many visitors which we have overheard.

The recognition of the type of locomotive which pulled the train in which one left the old home town—a very vivid memory that!—or the ferry on which a couple made their honeymoon trip; this sort of thing makes a personal appeal to many individuals quite apart from their more obvious mechanical or historic interest. It is quite certain that showman's engines, roundabouts and other features of the old-world fairground (which is, alas! only too rapidly giving way to the modern cellulose-and-chromium "amusement park") are a focus for nostalgic reminiscence. A particularly realistic model of a traction engine will often evoke the expression "You can almost smell the hot oil!"—and psychologists tell us that there is a subtle association between memory and the sense of smell, which probably shows that the model has awakened a deep-seated subconscious impression.

Model engineers are often accused of living in the past; but while this is as fallacious as most other generalisations, the undoubted fascination of many of the engines, ships and vehicles which are rapidly passing away is capable of a rational explanation on this basis. We live in a world in which the exigencies of existence keep us tied down to hard earth most of the time, and illusions are ruthlessly torn away; who shall blame us if we occasionally escape into a more tranquil and—as some of us believe—a more beautiful and romantic world of the past?

What to see at . . .

THE MODEL ENGINEER EXHIBITION



MORE COMPETITION MODELS

OUR first impression of the ship model entries in this year's Exhibition, that is so far as can be seen from the entry forms and photographs, is that the standard of workmanship and realism is higher than ever. We seem to remember having said that of previous exhibitions, but if it were not so there would be something seriously wrong. With individual modellers each model is, or should be, an improvement on the previous one and, as for newcomers to the hobby, they are usually inspired to begin by seeing the models other people have made. Those of us who have been years at the game are often surprised at the crudity of some of the models of years ago, and wonder how it is that they impressed us so much at the time.

However, to get down to business : these notes are merely first impressions, based in rare cases on a preview of the model, in others on what we know of the competitor's previous work, and in most cases on what we can gather from a photograph or from the information on the entry form. In no case must they be taken as a crtical commentary on the model, nor as an indication as to how they will be placed when the judges get to work on them. We merely wish to point out some of the more interesting features of the models, so that the visitor to the Exhibition will be enabled to make the most of his visit.

Continued from page 182, *August* 13, 1953.

The most numerous class among the ship models is, as is usually the case, the miniature. At one time the miniature was often a mere sketch of the original showing the general proportions and the main features of the superstructure. Nowadays the amount of detail included by our best miniaturists is simply incredible. We are still amazed at the rigging of Donald McNarry's frigate in last year's Exhibition and agree entirely with the remark of one of the stewards who, on examining very carefully the same modeller's brig of the previous year's Exhibition, said : "I simply don't believe it." This year Mr. McNarry is entering a waterline model of R.M.S. *Scot*, one of the most beautiful liners of the Victorian era. Built in 1891 for the Union Line, before it was merged in with the Castle Line to become the Union-Castle Line, she earned for herself a great reputation for both beauty and speed. Later she was lengthened, in which process she lost the lovely proportions which made her famous. We are pleased to see that Mr. McNarry has modelled her in her original form.

G. H. Draper, of Ilford, Essex, is sending in three models of naval open boats, an entry which he has named "Naval Elegance." Mr. Draper has made a careful study of these boats and this, with his superb craftsmanship, ensures an entry which will be worthy of the closest scrutiny. One of the boats is a barge of 1800, while the other two are boats of 1911 and 1913. It should be interesting to compare the elegance of the earlier period with that of the later.

E. N. Taylor, of Gosport, Hants., invariably sends us a good model, and we look forward to seeing his scenic model of S.S. *Pacific Unity* with tugs, in the Manchester Ship Canal at the famous Barton aqueduct. This gives scope for a wide range of talent in modelling, and we feel sure Mr. Taylor will cope effectively with each aspect of his subject. Neither Mrs. Taylor nor Mrs. McNarry are exhibiting this year. In fact no ladies seem to be exhibiting in the ship modelling section. This is a state of affairs which calls for attention. Their work in the last few exhibitions was so good that we were confident there would be more this year. Now ladies, what about it ?

J. L. Bowen's 100 ft. = 1 in. miniatures of liners have always been admired both for their clean craftsmanship and for the lovely restrained colours of their setting. This year he is exhibiting a model of M.S. *London Splendour*, a modern tanker of 24,600 tons. Just as in the Royal Navy, the aircraft carrier is becoming the important type, so in the Merchant Navy the oil tanker is continually increasing in size and importance. The large tanker is less glamorous, but in its way quite as impressive as the liner, and it will be interesting to see Mr. Bowen's version of this, to him, new type.

R. Carpenter, of Brighton, Sussex, has built a number of very fine miniatures, and this year is entering

a model of the Federal Line cargo liner M.V. *Surrey*. This is to the scale of 35 ft. = 1 in., which should enable him to embody a considerable amount of detail. R. V. Gardner, of Brockley, is sending a model of *Cutty Sark* in a dimple bottle. The ship is shown in full sail and including the stuns'ls has 37 sails set. This is quite an achievement and, knowing Mr. Gardner's high standard in this type of model, we look forward to seeing it. There are two miniatures of H.M.S. *Victory* —a rather difficult ship to reproduce to a small scale—one by R. H. Harknett of the Thames Shiplovers Society and the other by E. C. Freeston of the Wembley Society.

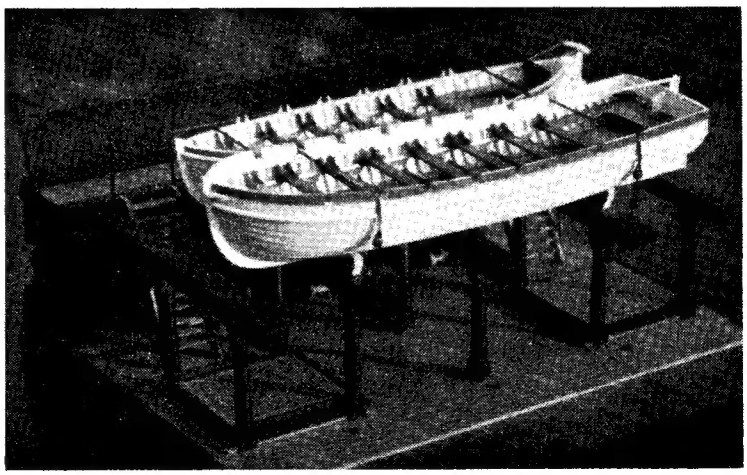
Model of an R.A.F. crash tender by Eric Leggat, of Aldershot

A magnificent ⅛-in. scale model of H.M.S. "Victory" and its builder Norman H. Macleod, of Bognor

Charles Gray of Bridge-of-Weir, Renfrewshire, has entered a model of R.M.S. *Orion*, and another of T.S.S. *Duchess of Montrose* and the Bristol S.M.S. has also sent two models, one of the M.V. *Thermopylae* by F. J. Greenham and the other of a Bristol Channel pilot cutter of 1890 by M. H. A. Kempster. This by no means includes all the miniatures but enough has been said to show that this section contains much of interest.

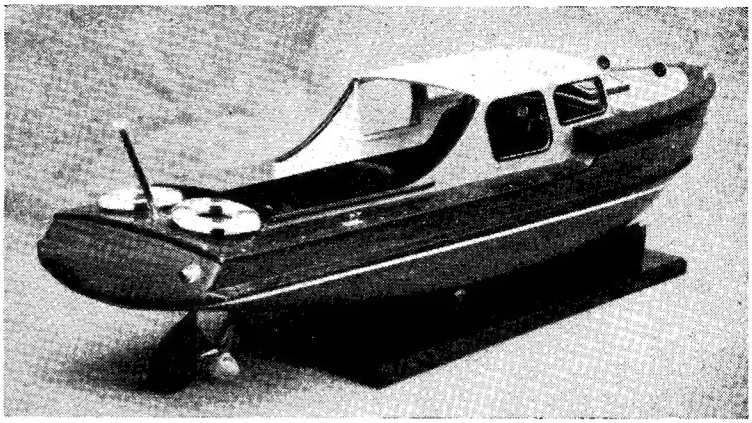
Models of sailing ships (non-working) form the next largest section. Our photograph illustrates one of the most imposing entries, imposing not for its size, but the completeness and intricacy of its detail. This was built by Norman H. Macleod, of Bognor, and is to the scale of ⅛ in. = 1 ft. Everything about the model has been made by its builder, and each block is fitted with a sheave. We have seen this model occasionally at different stages of its construction, and have always been impressed by the infinite care and patience displayed by its builder. The model in its unfinished state has already won high awards in various exhibitions on the south coast.

Another impressive model is that of H.M.S. *Prince* of 1670 which is entered by R. J. Collins, of Great Bookham, Surrey. Here again everything has been made by the builder. Visitors to last year's Exhibition and the previous one, will have already seen it, for it is the one on which Mr. Collins was working to illustrate his points on the demonstration stand. This is a very colourful model, and shows effectively the gorgeousness of the ships of that period.



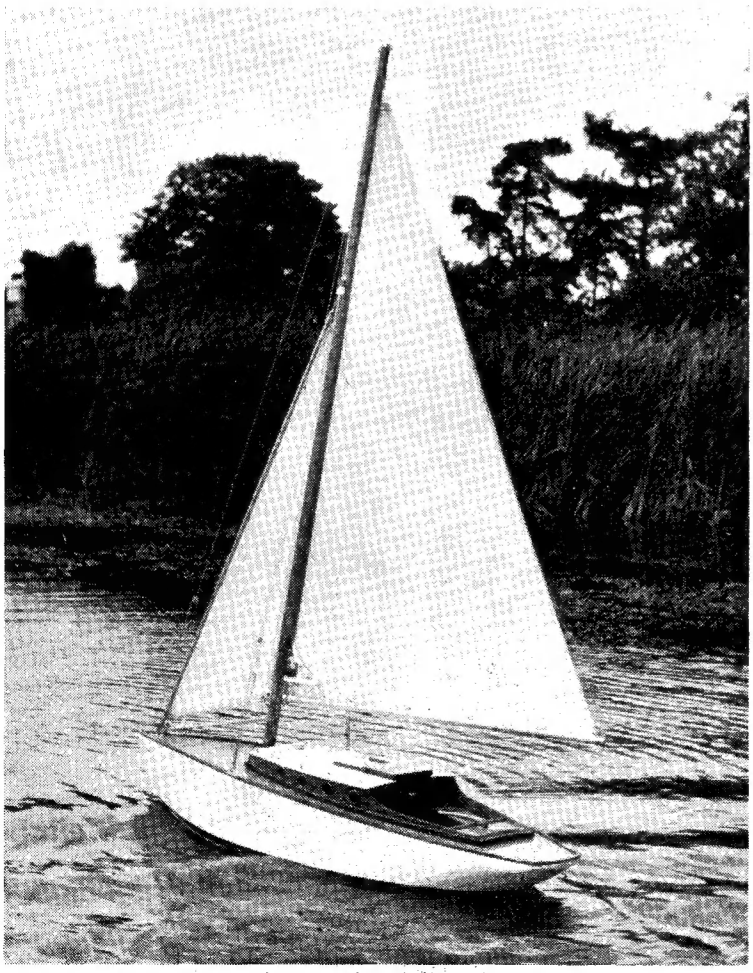
Mr. Pariser's interesting model of ships' boats of the Nelson period

The famous Birmingham trio, Messrs. Field, Pariser and Clarke, who won the Club Team Prize for their club in three previous exhibitions have, this year, gone over to small boats. Surely Mr. Draper's beautiful models of naval boats in last year's Exhibition have given them ideas. Mr. Field has entered a carvel built yawl of 100 years ago, and a clinker built beach boat. Mr. Pariser's contribution shows a portion of a ship of the Nelson period which includes bulwarks, guns, gangways, and boat skids, on which are stowed two boats, a whale boat and a launch. Mr. Clarke's model is of a Shetland Sixern, a double-ended open fishing boat with lug sail, a type which shows unmistakeable evidence of its Viking ancestry.



A cabin cruiser by Indrikis Dimza, of Berwick-on-Tweed

A notable model in this section is that of a Humber Keel which has been entered by E. Harrison, of Beverley, Yorkshire. This is a very successful representation of a type of ship which has almost disappeared. The model, which is planked, is full of interesting detail and forms a valuable record of its prototype. The model of a 36-gun frigate of 1812, entered by Coder (Ed) C. L. Robinson, of H.M.S. *Adamant* is also an interesting historical model. R. Hutson, of Hounslow, has entered a model of the Norwegian training barque *Stratsraad Lemnkuhl* originally the German training ship *Grossherzog Friedrich August*. From a photograph, the model appears to have good proportions and nice detail. J. W. B. Soddy, of Luton, and F. W. Edge, of Sheffield, have both sent in models of a ship of the Cinque Ports. We have seen Mr. Soddy's work in previous exhibitions and confidently expect a good model. Other models in this section include a Revenue Cutter (*c* 1800) by C. W. Street, of Southall, Middlesex, a tubular type lifeboat by the Rev. A. Everall, of Sheffield, and a model of the *Cutty Sark*, when she was the Barquentine *Ferreira*, by J. A. Pomeroy, of Gerrard's Cross. This is a commendable variation on the all-too-common *Cutty Sark* theme, and we look forward to seeing it.



Radio-controlled auxiliary sloop, " Geebaa II," by H. R. Clayton

The working models of steamers form an important section and we are pleased to see the interest taken in this type. Our only complaint is that interest seems to be centred on the cabin cruiser type of craft, and not on models of prototype ships. The cross channel packet, or the large modern trawler, or even the modern type coaster, is to our minds, more interesting to model, and

certainly looks better on the water. Colin Verity, of Hull, has entered a model of the M.V. *Rhodesia* which is a medium-sized fruit ship, carrying 10 or 12 passengers. The scale is $\frac{3}{16}$ in. = 1 ft.—a very convenient scale for nice detail—making a model almost 5 ft. long. Mr. M. J. Glandfield, of Richmond, Surrey, has submitted a $\frac{1}{16}$ in. scale model of R.M.S. *Queen Mary*. We will be interested to see how he has solved the problem of modelling such a large ship as a working model. Unless a lot of detail is sacrificed the model becomes rather too delicate for the conditions which usually prevail at the pond side.

A Smart Cabin Cruiser

An interesting cabin cruiser has been submitted by Indrikis Dimza, of Berwick-on-Tweed. This has a quite smart appearance and is powered by an unusual engine, both boat and engine being of the competitor's own design. A nice model of an R.A.F. Crash Tender or Fire Launch is entered by E. Leggat, of Aldershot. The hull has nice lines, and the general appearance is good. The hull is double planked mahogany as in the prototype. Amongst the other models in this section will be found three M.T.B.s and an ocean going tug. A large proportion of the cabin cruisers are designed for radio control, and in a number of cases this is already fitted.

The non-working models of steamers include two entries built in cardboard. This is encouraging, as very few modellers seem to realise the possibilities of this method. One is by R. V. Shelton, of Dunstable, whose work has been seen frequently at our exhibitions. He has entered a model of S.S. *Hero* shown moored and with a pilot launch coming alongside. The other is by P. T. Whitehead, whose work and methods was the subject of an article in the January, 1953, issue of *Model Ships and Power Boats* and who exhibited in last year's Exhibition. W. E. Pryor, of Windsor, has entered a $\frac{1}{8}$ in. scale model of R.M.S. *Caronia*. This should be a very impressive model provided the general proportions of the ship have been preserved. From Edinburgh comes a model of the Aberdeen lifeboat *Hilton Briggs*. This is submitted by Norman W. Wood. From the photograph sent with the entry form this has a very shapely hull, and looks a very nice model.

There are some interesting models in the section for Working Model Sailing Ships and Yachts. Our photograph shows *Geebaa II* a radio controlled sloop, entered by H. R. Clayton, of Chalfont, St. Peter, Bucks. In this, as in the cabin cruiser *Geebaa* which won a high award last year, the ship appears to be the first consideration and the radio control gear merely a means of controlling it. Incidentally this entry is a model of a yacht to be lived in, and not merely a racing machine.

Something Original

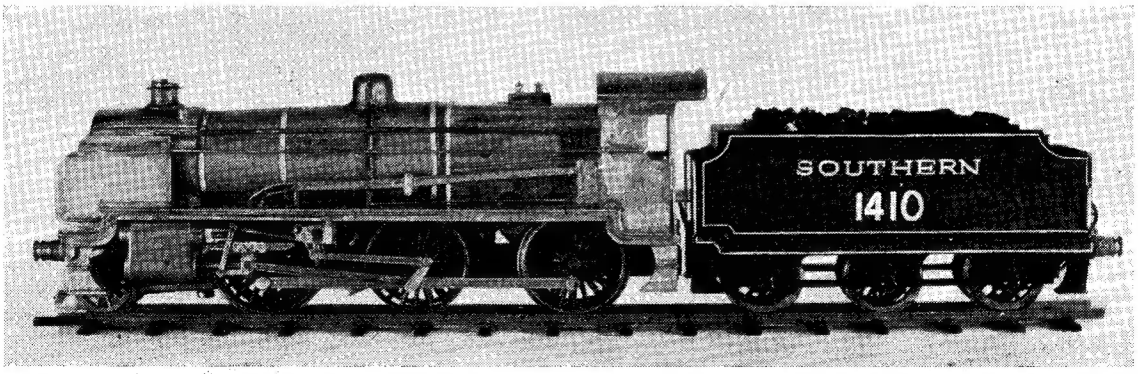
C. V. Thompson, of West Kensington, can always be depended on for something original, and this year he has entered a model of a Che Kiang Deep Water Sampan. These are the water tramps of China and their characteristic appearance is reproduced in the model. The only racing yacht to be entered this year is the "M" Class yacht *Eluane*, of Littlejohn design, sent by C. H. Keeler, of Windsor. However, this is a notable yacht as she was the winner of the "M" Class Open Championship in 1950. Perhaps the reason there are so few yachts this year compared with last, is that the exhibition is being held in the racing season instead of after it, as was the case last year. John D'oyly Wright, of Sevenoaks, Kent, sends a planked model of the *Santa Maria*. As all the fittings and rigging work correctly, this should be a model worth studying.

The section for Hydroplanes and Speedboats contains two models of notable speed boats, viz.: *Slo-Mo-Shun IV* and *Bluebird II*, Sir Malcolm Campbell's boat of 1939. The former is entered by W. A. Locks, of Catford, and the latter by Leslie Oldfield, of Huddersfield. Although both prototypes are record-breaking craft, it is not to be expected that when reduced to model form they will be as fast or as efficient as a model hydroplane designed purely for performance.

Locomotives, Class A

A 2½-in. gauge *Fayette* 4-6-2 engine, built from the "M.E." instructions and blueprints purchased in 1932, is the first to be noticed, according to the catalogue numbering. This engine is the work of Mr. R. H. Drummond, of Etwall, Derbyshire, who started it in 1930 and finished it in 1950. The chassis was illustrated by three fine photographs published in "L.B.S.C.'s" notes in the "M.E." for February 22nd, 1945, and there is undoubtedly some fine work in it. An interesting modification which Mr. Drummond has made is in the fixing of the front portion of the connecting-rod, which has a proper sunk screwed collar and tapered pin instead of the screw specified.

Mr. F. C. Cook, of Southall, has entered a 3½-in. gauge L.M.S. Class "5" 4-6-0 locomotive built to "L.B.S.C.'s" notes for *Doris*, but embodying several alterations with a reason for each. For example, the engine has double-ported piston-valve cylinders with multi-jet exhaust,



S.R. 2-6-0 locomotive No. 1410, made to 4 mm. scale by Mr. V. R. Berris, of Dulwich

and there are four inspection holes in the top of each valve chamber. Mr. Cook's reasons for these are : first, the double ports give a longer valve head, with, it is hoped, improved seal and better resistance to wear ; second, the multi-jet exhaust seems to be the obvious outcome of the double-port design, and probably gives a freer exhaust ; third, the inspection holes make for more accurate valve setting than seems possible by the usual method. Clearly, Mr. Cook has put some careful thinking and sound reasoning into this locomotive.

Planning

There is an interesting 2½-in. gauge 2-6-0 locomotive entered by Mr. L. A. Roberts, of London, S.W.2. It was originally intended to be a *Dyak*, but Mr. Roberts found that the dimensions compared favourably with those reduced from the L.M.S. Class " 5 " 2-6-0 which he preferred ; so he tried to follow the latter by slightly reducing the diameters of the smokebox and boiler barrel to allow for a tapered lagging and adding top-feed and L.M.S. cab, tender and valve-spindle guides. This is another case of thoughtful planning before proceeding to construction.

We now come to something entirely different, a 2½-in. gauge Erie Railroad 2-8-8-8-2 compound Mallet articulated locomotive built by Mr. S. E. Watson, of Sheffield. This most unusual model has been built to drawings supplied by the Baldwin Locomotive Works, Philadelphia, U.S.A. ; it is 4 ft. 3 in. long overall, works at 80 lb. pressure, has a fully riveted boiler, equalised springing, air brakes and air reversing—all this on 2½-in. gauge ! We can be sure that this exhibit will attract the closest attention from all who are in any way interested in miniature locomotives.

A 5-in. gauge, 4-4-0, *Maid of Kent* type engine by Mr. R. K. Boardman, of Sudbury, Suffolk, has something of a " background." Its builder is the managing director of an agricultural and general engineering business, a fact which would seem to augur well for the quality of workmanship. The principal reason for the construction of this engine is to promote enough interest in our hobby, in the Sudbury district, to lead to the formation of a club. We hope that this idea will prove to be successful.

Mr. Thomas Annells, of Shoreham, Kent, is exhibiting a 3½-in. gauge " rebuild " of the Southern Region's 4-6-2 type, partly to " L.B.S.C.'s " *Pamela* notes. All the motion work is cut from stainless steel bar, to ensure that it will stand up to hard wear. The boiler was made up from sheet, the main seams being riveted and sifbronzed, the other joints being silver-soldered ; it was tested to 250 lb. per sq. in. The maximum load hauled by this engine, so far, is one adult and eight children. Mr. Annells works in an attic workshop equipped with lathe, drilling machine and hand tools.

A 3½-in. gauge *Juliet* 0-4-0 tank locomotive comes from Mr. C. H. Cosby, of Sevenoaks, Kent. It was built, of course, to " L.B.S.C.'s " published instructions, and is its builder's first attempt ; it has occupied spare time spread over eighteen months, and Mr. Cosby has written to say that, on Saturday, July 11th last, this little engine, on a straight track and with 60 lb. " on the clock," hauled four adults and two children from a standing start without trace of wheel slip. The total weight, inclusive of trolleys and engine, was just over 50 stone !

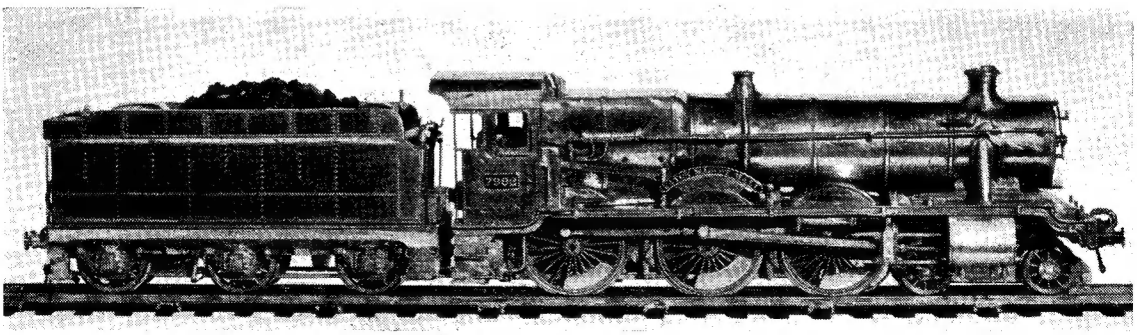
Locomotives, Class B

This class is for 1¾-in. gauge or less, and at the time of writing, the 4-mm. scale predominates. This is hardly surprising today ; but we have noticed that, in recent years, there is a marked and growing tendency to apply true model engineering methods to the building of these little things, bringing them far above the " toy " category, in spite of the application of electricity instead of steam for driving them. We have no doubt that among these exhibits our visitors will find some lovely work.

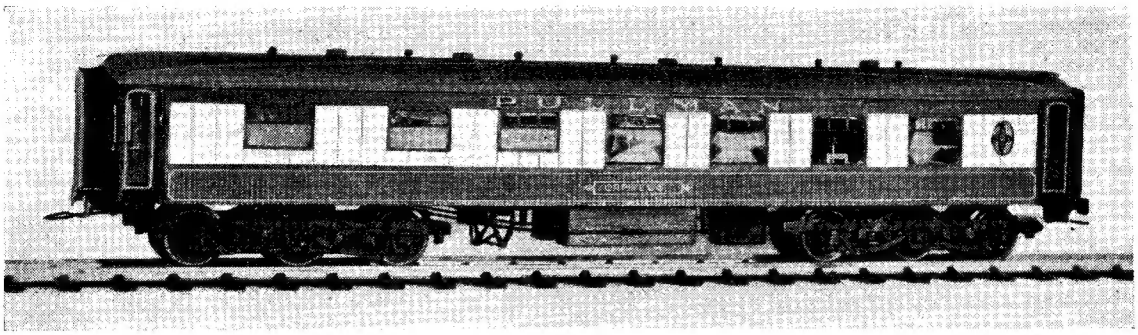
All the way from Bellshill, Lanarkshire, Mr. H. R. Heng has sent us a 4-mm. scale Midland Railway 4-4-0, three-cylinder compound locomotive. It is complete except for painting, and we understand that it was built " on the kitchen table," with hand tools only.

A British Railways sleeping-car attendant, on the Western Region, Mr. H. J. Elmore, of Hayes, Middlesex, is exhibiting a 7-mm. scale " Britannia "-class 4-6-2 locomotive which is not quite in the ordinary run of such things. Mr. Elmore says that the idea came to him when the " Britannias " were " drawing our train from Plymouth to Penzance." Further, he chose a " Britannia " to enable him to make use of an *ex*-Government motor and rectifier, and the power output and general performance are most satisfying. The engine can be taken apart for examination, when necessary, merely by unscrewing the front buffers and two numberplates.

Mr. D. A. Williams, of Beckenham, is exhibiting a 4-mm. scale, 18-mm. gauge S.R. " Nelson " class 4-6-0 engine, No. 857, *Lord Howe*, fitted with round-top firebox. This little model is fully sprung, and parts of the motion are made in different metals, to test the wearing qualities. The model is arranged for two-rail operation and was built in a " digs " bedroom.



A 4-mm. scale model of G.W.R. engine No. 7902, " Eaton Mascot Hall," by Mr. K. Northwood, of Edinburgh



A 4-mm. scale Pullman car made by Mr. P. A. Willis, of Dulwich. Note the amount of detail in the bogie frames

Mr. V. R. Berris, of London, S.E.21, has sent in an exhibit consisting of a Southern Region "N" class 2-6-0 locomotive and two bogie passenger luggage-vans, all in 4-mm. scale. The engine is based on No. 1410, on which the driver's controls are the reverse of the standard arrangement for the class.

Another little model that has come all the way from Scotland is, surprisingly enough, a 4-mm. scale G.W.R. "Modified Hall" class 4-6-0 engine, No. 7902, *Eaton Mascot Hall*. It is powered by an American Pitman motor installed in the tender, the drive being taken to the driving wheels of the engine by means of a rubber band, universal joints and gears.

An old-time note is struck by Mr. J. B. Bentley, of Bedford, who exhibits a 4-mm. scale Adams 4-4-2 radial tank locomotive, formerly belonging to the L.S.W.R. but modelled as running on the East Kent Railway prior to 1946.

Mr. R. S. Carter, of Horley, on the other hand, seems to prefer something more modern, for his entry is a 4-mm. scale Bo-Bo diesel-electric locomotive based on the London Midland Region No. 10800.

Mr. R. J. B. King, of Strood, Kent, whose beautiful 18-mm. gauge locomotives attracted so much attention last year, is represented this year by a 4-mm. scale Great Eastern Railway 0-6-0 tank locomotive, the workmanship of which appears to be well up to its builder's excellent standard.

A "first attempt" at any kind of modelling is to be seen in a 4-mm. scale G.W.R. 0-4-2 tank engine made by Mr. E. A. Hobbis, of Birmingham. Although he has made use of commercial parts for this model, Mr. Hobbis has modified them all to suit his particular desires.

Mr. H. Ranger, of Guildford, favours the popular "T9" class 4-4-0 engines of the Southern Region, and is showing a nice little 4-mm. scale model of one of them.

Rolling-stock and Accessories, Class C

Here we find a number of various railway models, ranging from 1-in. to 4-mm. scale. Of the eleven entries, at the time of writing, nine are rolling-stock of various kinds, the other two being scenic models.

Road Vehicles, Including Tractors, Class L

A one-tenth scale model of a jeep, complete with tool-kit, made by Mr. J. R. Wright, of London, S.E.19, is an example of model-making by observation rather than from specially prepared drawings. It evidently dates from the war period, because Mr. Wright states that he used a published photograph of a jeep and watched these vehicles passing in convoy; his equipment was hand tools only; the necessary turning was done while he was fire-watching, and the tool-kit was made "entirely in my armchair."

Mr. W. R. Finch, of Potters Bar, has sent in a $\frac{3}{4}$-in. scale model of a $4\frac{1}{2}$-litre "Blower" Bentley car, the Birkin Le Mans car of 1930, which was the imposing classic British racing car of almost legendary fame. The model was built from photographs as well as from particulars taken from the actual car.

Of the few traction engines of which we have any news at the time of writing, one by Mr. W. D. Urwick, of Taplow, Bucks, seems to call for special mention. It is a $1\frac{1}{2}$-in. scale engine based on an original design by the late Henry Greenly, but includes some modifications; except for the pressure gauge, it is entirely home-made. Mr. Urwick's workshop equipment includes the novel type of home-built lathe, which was at the "M.E." Exhibition in 1951, and the dividing-head, exhibited in 1952, on which all the traction engine's gears were cut.

Junior Engineering, Class S

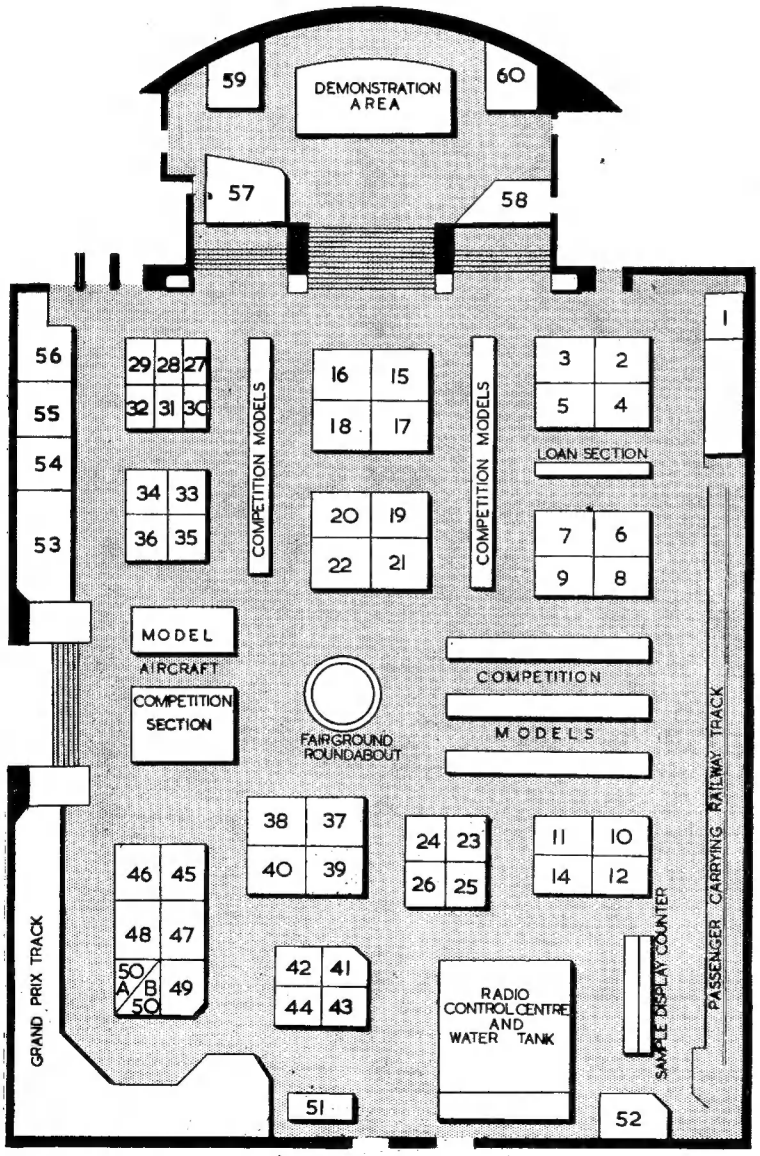
First attention in this class must be given to five-year-old Michael Barry Edge, of Sheffield, who is unquestionably our youngest competitor this year. His entry is a one-tenth scale model of a Thames sailing barge and, apart from the fact that his father cut out the hull and base on a fret machine and made the glass case, the model is Michael's own work. This is another, and quite remarkable instance of the old-time prototype appealing to the modern youngster, and may well give some of our critics a little food for thought!

On the other hand, 15-year-old Roger Holden, of Burgess Hill, has entered a model of a space ship of the future, which he claims as his own design. Here we have a case of a laudable tendency for a boy to think things over for himself in an attempt to be original; that his model will attract much attention is certain, since it is 6 ft. long and was built "on the kitchen table."

Between these two extremes, there are: Model racing cars, an unfinished $\frac{3}{4}$-in. scale S.R. "Schools" class locomotive, 4-mm. scale locomotives, model ships, "bottle" models, model railway station buildings, a radio-controlled cabin cruiser with a two-valve transmitter to suit, a fishing reel, an oscillating steam plant and a small bench vice, all made by lads under 16 years of age.

THE MODEL ENGINEER EXHIBITION

ALPHABETICAL LIST OF EXHIBITORS AND GUIDE TO THE TRADE STANDS



Sample Display Stands

Braid Bros.
Cowell, E. W.
E. R. Howard Ltd.
Micromodels Ltd.
Rawlplug Co. Ltd.
Web Model Fitting Co.

THE MODEL ENGINEER EXHIBITION

TRADE STANDS

Aeronautical Electronic & Engineering Co. Ltd., Sunleigh Works, Alperton, Middlesex.

This firm, not a familiar name to the modelling world until recently, is now producing in quantity the widely known and respected Amco engines. On display will be the Amco 3.5 c.c. diesel engines in the "BB" (ball-bearing) and the "PB" (plain bearing) types. These two engines have made a tremendous name for themselves in the competition field, mainly stemming from their reliability and exceptionally high power-weight ratio. Indeed, the "BB" engine has proved on test to be the most powerful diesel engine of its capacity available. These small engines are a masterpiece of precision engineering and the stand is well worth a visit on this score alone.

Associated Iliffe Press, Dorset House, Stamford Street, S.E.1.

The publications of this firm are well-known to all readers, and include *Amateur Photographer*, *The Autocar*, *Flight*, *The Motor Cycle*, *Wireless World* and *Yachting World*. In addition to these journals, many technical books on subjects of interest to amateur and professional engineers are displayed on this stand.

Black & Decker Ltd., Harmondsworth, Middlesex.

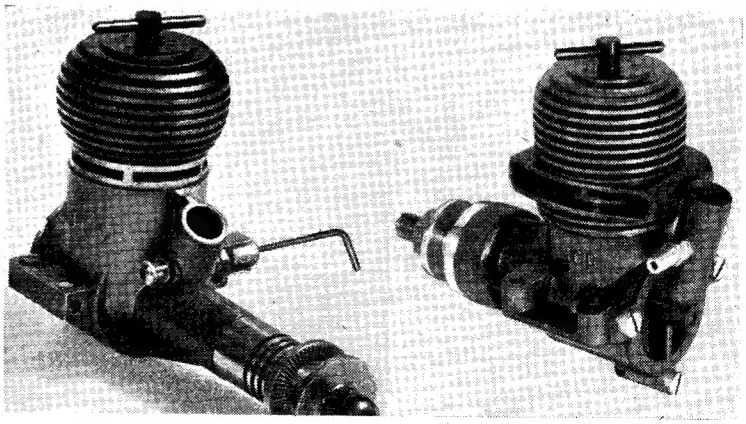
The well-known electrically driven tools and accessories manufactured by this firm include a complete range of "Handy-Utility" tools designed specially for the use of the amateur craftsman and the small professional workshop. The accessories for these tools include vertical and horizontal stands to convert the $\frac{1}{4}$ in. and $\frac{1}{2}$ in. electric hand drills to drill presses and power grinders, also a disc sanding table attachment of special interest to woodworkers. Other electrically driven tools include the 5 in. sander/polisher, and the 6 in. heavy duty saw, which can be equipped with blades of different sizes for a variety of purposes in general woodwork, and is also adaptable for work on sheet metal, cast-iron, asbestos, brick, etc. The latest addition to the range is the No. 44 orbital sander, which weighs only $5\frac{1}{2}$ lb., but has a sanding surface of $3\frac{5}{8}$ in. $\times$ $7\frac{1}{2}$ in., and will produce a smooth finish on woodwork many times faster than can be attained with hand sanding.

Bold & Burrows, 12-16, Verulam Road, St. Albans, Herts.

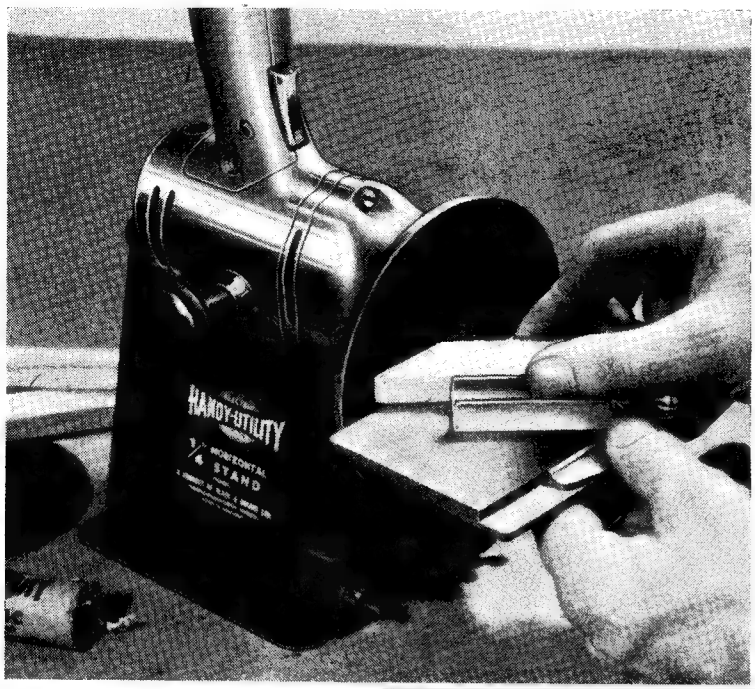
This firm supplies a full range of model-makers' requirements, including machine tools and equipment, hand tools, electric motors, also kits for model aircraft construction, radio control equipment, and a full range of technical publications.

Bradshaw Model Products Ltd., 5 & 6, Western Road, Hove 2.

Model railway enthusiasts will find this stand of great interest, for



The two fine Amco diesel engines demonstrated on stand 47a



The ¼-in. Handy-Utility electric drill on horizontal stand, adapted for use as a hand grinder

Bradshaws deal in all the principal proprietary products such as Acro, Rivarossi, etc., and cover practically every need for "OO"-gauge. Finished products and kits of parts figure prominently here; and we must call particular attention to the bogie trolley wagons, as they are surely masterpieces in the art of die-casting. Track, finished and in parts, is a speciality that is well worth close inspection on this stand.

Braid Bros., 50, Birchwood Avenue, Hackbridge, Surrey.

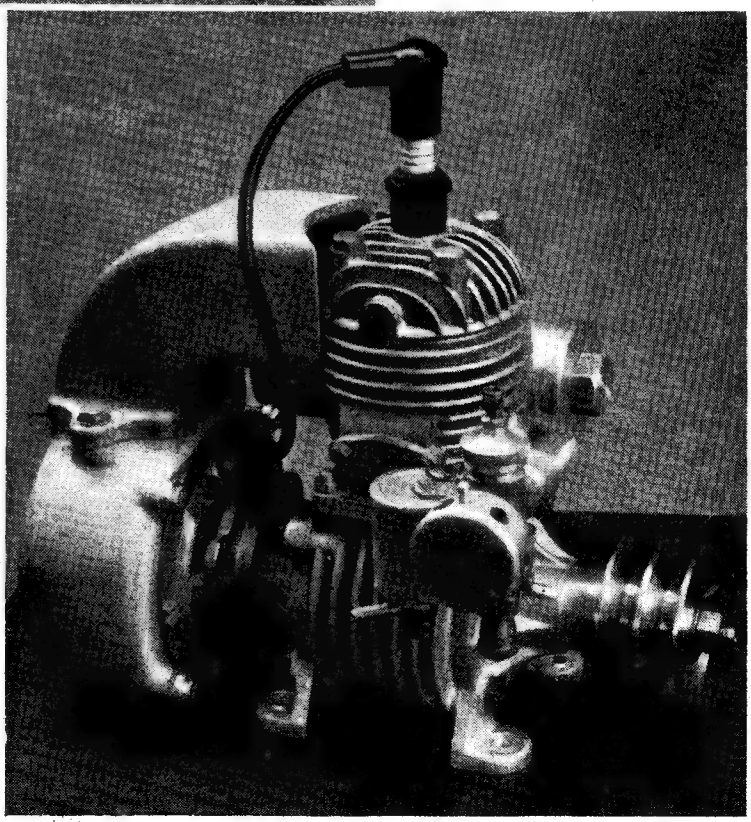
This firm is well known for their refrigerator components which will be on view again this year, and will include several new lines. Complete units are now available for both compressor and absorption type refrigerators, together with all fittings, cabinets, etc. The castings and parts for the construction of the "Busy Bee" 50 c.c. auxiliary engine are again shown, and a further development of this engine is on view for the first time, namely the "Bumble Bee" 50 c.c. stationary engine, together with accessories such as the Wico-Pacy "Bantamag," and "Amal" carburettors to suit these engines.

British Model Aircraft Manufacturing Co. Ltd., 180, London Road, Mitcham, Surrey.

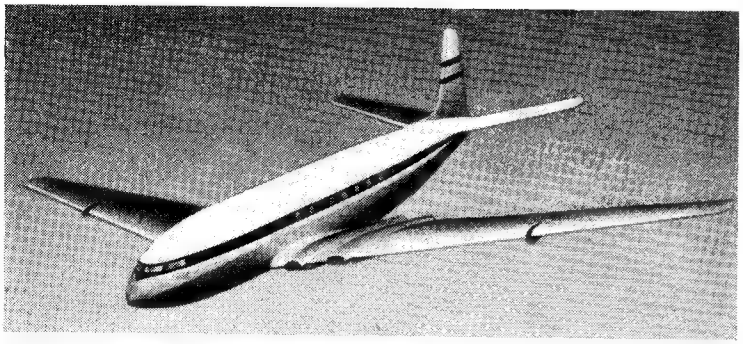
The makers of the well-known Skyleada and Skyrova kits for the construction of flying model aircraft have a fine display on their well designed stand. Prominent features are the newest additions to the flying scale range, the Jetex powered models de Havilland Comet and the Avro Vulcan, both very much in the news at present. Another kit range includes flying scale models of aircraft of historic interest based on aircraft of the first world war. Also on sale will be the latest additions to the really sound 3s. 6d. range, which features kits of complete parts which make up into fine flying models.

Buck & Ryan Ltd., 310-312, Euston Road, London, N.W.1.

The stand of this well-known firm of tool dealers is practically a permanent institution of THE MODEL ENGINEER Exhibition, and always a centre of attraction for craftsmen who are interested in good tools. The range of exhibits includes all



The "Bumble Bee" stationary engine, by Braid Bros.



British Model Aircraft Manufacturing Co. show a kit of materials for constructing this Comet air liner ; also many other kit models

types of hand and machine tools, both for wood and metal work, and a full range of measuring instruments, such as micrometers, slide gauges, calipers and dial test indicators, together with machine tools such as lathes for wood and metal, drilling machines, planers, shapers, also machine tool attachments and accessories of all kinds.

Chloride Batteries Ltd., Exide Works, nr. Manchester.

These well-known manufacturers of both primary and secondary batteries are showing examples of the various types of Exide accumulators specially suited for model work, such as the propulsion of model boats, signalling and control gear of model railways and for energising radio control transmitters and receivers ; also the Drydex dry batteries, which have many similar applications in models where current demands are not excessive. Typical applications of these batteries will be demonstrated.

E. W. Cowell Ltd., 7a, Sydney Road, Watford, Herts.

The sets of machined castings for machine tools which are the speciality of this firm are again on view, including castings for lathes, drilling machines and hand shapers. An entirely new feature this year is the ⅜ in. motorised bench drilling machine, which is available in a finished state. This is equipped with a dual drive, giving a speed range from 200 to 2,800 r.p.m.

R. J. Deaves, 57, Tennyson Road, Small Heath, Birmingham.

The demonstrations held by Mr. Deaves are always a centre of interest at the Exhibition. New devices this year include the new tungsten wheel cutters for plate and sheet glass, Opalite, Vitrolite, etc., and the "Multiscope" combined optical instrument, in addition to items which have been displayed on previous occasions.

Easibind Ltd., 84, Newman Street, London, W.1.

Readers of THE MODEL ENGINEER who wish to preserve their copies will find the simple method of binding demonstrated by this firm of great interest. Each issue can be inserted immediately it is received, without waiting for the complete volume to be published. It gives the appearance of a perfectly bound book. "Easibinders" are made for all model engineering journals and other technical papers, and can be supplied with the titles and volume numbers in gold lettering.

"Engineer Apprentice," 65/66, Chancery Lane, London, W.C.2.

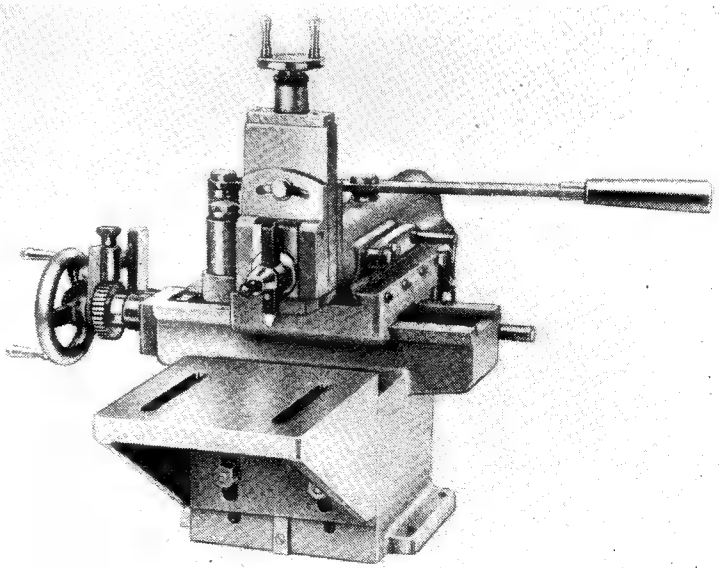
The journal *Engineer Apprentice* which is featured on this stand is a monthly illustrated magazine intended particularly to assist the engineering student or apprentice. It contains articles dealing with lathe work, general engineering practice, mechanical drawing and other practical subjects.

Fenners Ltd., Profile Works, 90b, Church Street, Woking, Surrey.

This firm specialises in the production of apparatus and components for the radio control of models, and one of their latest productions is the Fenner-Pike Servo Unit, which is used for the mechanical operation of steering and other controls. It can be used in conjunction with the normal type of receiver and relay unit, weighing approximately 2½ oz. Another special item on show is the control box (pulsing unit) for use in conjunction with it. This measures about 4 in. × 3 in. × 1½ in. exclusive of the battery, and includes both press-button and proportional control devices. These units are shown connected to radio units of model aircraft and boats in full working order.

Hamblings, 10, Cecil Court, Charing Cross Road, London, W.C.2.

The pioneers of "OO"-gauge, and always right in the forefront of developments in that small size for model railways, this firm, in 1946, introduced a range of two-rail points

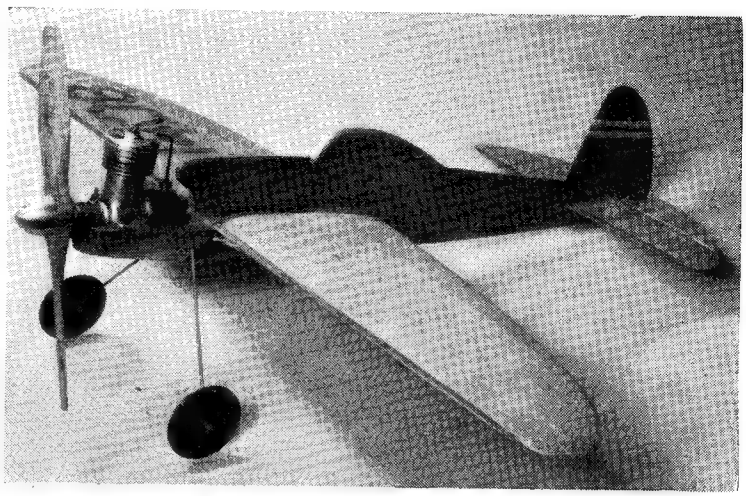


The "Cowell" hand shaping machine

built ready for use. These points are shown in use in a very realistic section of trackwork; they are correctly "rodded" and manually controlled from an "Addalever" frame. Exhibition displays of this nature usually show just an oval track on which a train is running interminably round and round; but here is to be seen an example of pointwork correctly sectioned and properly controlled, set in attractive surroundings.

In addition to the range of "OO" constructional parts, all-metal coaches and many other useful products, there are some new "Bilteezi" construction-sheets, one of which is for signalboxes and groundframe huts, and there is a very attractive half-timbered Elizabethan building that can be modelled as a residence, or country hotel.

All devotees of "OO"-gauge should make a special note to visit this stand.



The kit for this prefabricated control-line model, called the "Champ," is one of the many models exhibited on the Keil Kraft stand

E. Keil & Co. Ltd., 195-197, Hackney Road, London, E.2.

Two new prefabricated kits will be the centre of attraction on the stand of this well-known model aircraft kit manufacturer. These are the *Sportster* and the *Champ*; both designed to be assembled from ready-cut and coloured prefabricated parts. The *Sportster* is a rubber powered model whilst the *Champ* is a simple control-line trainer. In addition there will be made-up models of most of the eighty-odd kits that comprise the full range of models including new additions to the Jetex 50 powered flying scale models—the de Havilland 110 and the Avro 707A. Also on sale will be a new edition of the widely known Keil Kraft handbook with articles of interest on all aspects of aero-modelling.

Kennion Bros. (Hertford) Ltd., 2, Railway Place, Hertford.

Castings, materials, fittings and blueprints for most of "L.B.S.C.'s" well-known locomotives, as well as for the Kennion 5-in. gauge 0-6-0 tank locomotive *Butch*, will be found in profusion on this stand. Also, there will be included a wonderful range of Kennion taps, dies, special injector-cone reamers, precision-made screws in a large number of different sizes and at very reasonable prices.

Metal sheets, tubes, rods of most sections and many different sizes and a useful range of small tools, all specially to meet the needs of the model engineer, will tempt the visitor to this stand.

E. Law & Sons (Timber) Ltd., High Street, Sutton, Surrey.

Supplies of balsa, obeche, fine ply, and other woods for model building will be available at this stand. As specialists in the timber field, Laws can provide carefully selected woods ideally suited for the exacting needs of the model world. Of additional interest will be the display of the new range of Veron scale kits for the newest and smallest Jetex motor—the 35. This stand also features a new basic helicopter, known as the Hovercopter. This model is sold ready to fly. There will also be an interesting display of "solid" scale model aircraft built from kits that will be on sale.

"Mason Master," London Road Works, Braunston, nr. Rugby.

At this stand will be seen the "Mason Master" tungsten carbide tipped drills, which are capable of producing holes in the hardest of materials, including stone, brickwork and concrete, and can be used in an ordinary drill brace. Special plastic plugs for masonry can be inserted in the holes produced by this tool, for the purpose of inserting screws for holding fittings of any kind firmly and securely. Other items include a range of mason's saws for cutting bricks, tiles and walls up to 9 in. thick.

Multicraft Tools, 406, Euston Road, London, N.W.1.

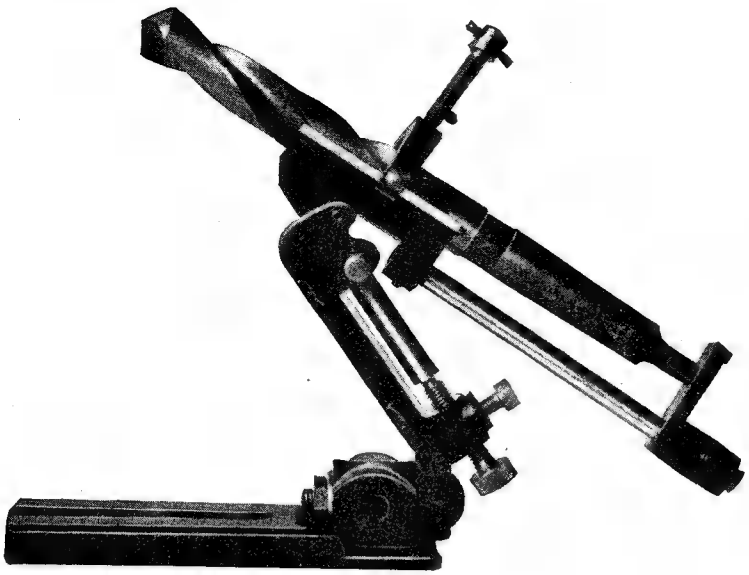
All model engineers are familiar with the products of this firm, which include the Multicraft precision cutter, sanding block, and Miniplane, with other accessories sold either singly or in the form of special kits for the use of model aircraft constructors and other amateur craftsmen. This year an entirely new production, the Multicraft Junior Knife, will be introduced. This has the blade housed inside the handle and capable of being quickly released. Blades of different shapes to suit various purposes are available, and the complete knife is slimmer than a fountain pen. It is capable of many of the duties for which the regular Multicraft cutter is employed.

Munster Chemical Co., 266, Munster Road, Fulham, S.W.6.

The main feature of this stand is a chemical preparation known as "Cromit" which will restore worn plate and will also plate brass, copper, nickel, etc. It enables worn cutlery, headlamp reflectors, cycle parts and domestic fittings to be renovated, or new articles to be chemically plated. Another item is "Silvit" for cleaning and repairing silver. Demonstrations of these preparations will be given continuously.

H. D. Murrary Ltd., 21, Queensway, Enfield, Middlesex.

The Reliance tools which are the speciality of this firm are well known to all engineers. An item which has stood the test of many years' use in both amateur and professional workshops is the Reliance drill grinding jig, and demonstrations

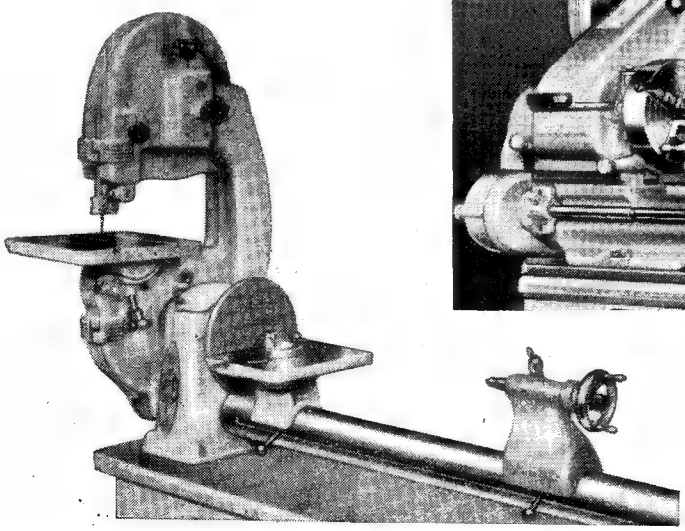


The Reliance twist drill grinding jig by Messrs. Murray

of the use of the jig will be given on the stand, showing the easiest method of correctly sharpening a twist drill. Other tools displayed include thread restorers, lathe centres, collet fixtures, and drill chucks and socket spanner sets.

Myford Engineering Co. Ltd., Neville Works, Beeston, Notts.

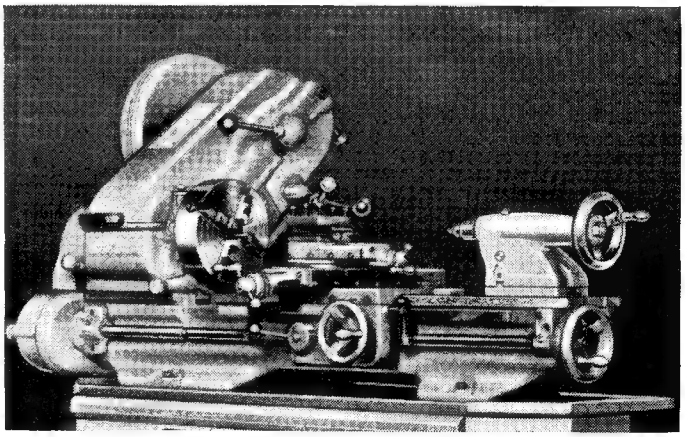
One of the principal attractions on this stand is the Myford Super 7 lathe, which made its first appearance at last year's Exhibition, and has already become fully established in many amateur and professional workshops. This lathe, however, does not entirely supersede the M.L.7 lathe, which is still as much in demand as ever, and is capable of dealing with practically any work likely to be required in the amateur workshop, though its capacity for heavy or high speed work is not equal to that of the Super 7. The standard M.L.7 is now obtainable fitted with a friction clutch to facilitate control, or the clutch can be obtained separately to fit existing lathes. Woodworking equipment includes the M.L.7 woodworking lathe, obtainable with the bandsaw unit, disc sander and equipment for turning large diameter work at the outer end of the mandrel; also the 4½ in. bench planer. Of interest mainly to the manufacturing engineer, is the Myford grinder, which is obtainable with equipment for both exterior and interior cylindrical grinding, also separate motor driven suds pump.



The Myford M.L.8 woodworking lathe, with bandsaw attachment and sanding disc fitted

Percival Marshall & Co. Ltd., 19-20, Noel Street, London, W.1.

This stand is devoted to the journals and technical books with which all readers of THE MODEL ENGINEER are familiar. Over 150 different technical books are displayed, covering every aspect of model engineering and small workshop practice, together with plans and working drawings for a wide range of model ships, locomotives, aircraft, cars, steam and i.c. engines and workshop accessories, totalling over 300 designs. Among special Exhibition offers, we call attention to "Loco Albums," comprising five colour prints of principal group railway locomotives showing correct colours, leading dimensions, and also giving the history of the locomotives concerned. These are available, for the period of the



The latest development of the 3½-in. Myford lathe; the "Super 7"

A portion of "Rozalex" being pressed into the hand

Exhibition only, for 2s. 6d.; also a leaflet "A Two-tool Back Tool Post" by "Duplex," giving full instructions for the construction, at 6d. each.

"Practical Crafts Magazine," and "Handicrafts Annual," 74, Holland Park, London, W.11.

The publications on this stand include *Practical Crafts Magazine*, a new monthly periodical of interest to all amateur craftsmen, and obtainable from all newsagents; also *Handicrafts Annual*, which contains a great deal of information of every type of handicraft work, also lists of tools and materials.

The Quickdraw Co. Ltd., 127, Gunnersbury Avenue, London, W.3.

The instrument demonstrated on this stand consists of a portable drawing board, which folds to the size of a brief case, and incorporates a combined instrument which serves as protractor, compass, T-square, with metric and inch scales. This is controlled by a pantograph device so as to serve as a complete draughting machine. The instrument is suitable for either the amateur or the professional in the production of line drawings, and can be used either "on location," or in the home, whenever quick and accurate drawing work is required.

The Rawlplug Co. Ltd., Cromwell Road, London, S.W.7.

Rawlplugs are too well known to need introduction to readers, and it may be stated that they have become indispensable both in the home and in industry wherever there are fixing jobs to be done. In conjunction with the use of Rawlplugs, special tools for boring holes in brick, masonry, concrete, etc., are demonstrated, including the durium tipped drills and various types of percussion tools, including the new Rawlplug drill hammer. The well known adhesives, "Durofix" and "Duroglue," plastic wood and metal cement, are also demonstrated.

H. Rollet & Co. Ltd., 6, Chesham Place, London, S.W.1.

Specimens of the 3,000 standard stock sizes of non-ferrous sheet, strip, rod, tube, wire and sections are shown by this firm, and in response to popular demand, material will be on sale at the Exhibition, including a range of copper tube in sizes suitable for model boiler construction. Free copies of a comprehensive catalogue and useful tables are available on request. Another feature of the display is a scale model of the warehouse, showing methods for storing and handling material.

Rozalex Ltd., Norfolk Street, Manchester, 2.

Barrier creams for the protection of the hands are shown on this stand, including Rozalex No. 1 which is intended to resist dirt, grease and grime, and Rozalex No. 8, which is water-resisting, and can be used in cases where chemicals or other wet work is handled. After the use of the barrier cream, the procedure of cleansing the hands is very simple, as no solvents or abrasives are necessary; just washing in the ordinary way with soap and water will leave the hands in perfect condition.

Dick Simmonds & Co., 5, South Road, Erith, Kent.

An old-established firm catering for the model engineer and especially the live-steam locomotive enthusiast, Dick Simmonds supplies locomotive castings and parts of all kinds and sizes up to 5-in. gauge. Most of "L.B.S.C.'s" locomotives are included, and the firm specialises in a fine 0-4-0 tank engine, *Ajax*, for 5-in. gauge.

The 2-in. scale Burrell road locomotive, *Thetford Town*, is another speciality which is meeting with considerable success.

Top Toys Ltd., 30, Sackville Street, London, W.1.

This stand features gyroscope tops, gyro cycles and other scientific novelties, such as pocket microscopes and needle threaders. An entirely new novelty is a liquid plastic from which balloons can be made, and which is also adaptable to a number of other uses.

Spiral Saws Ltd., 8b, Bedford Avenue, Trading Estate, Slough, Bucks.

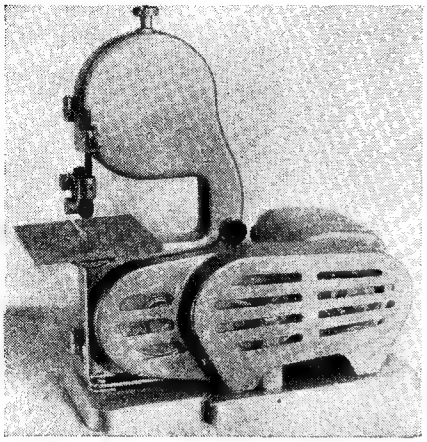
Demonstrations of the spiral hacksaw blade for either hand or machine uses are given on this stand. This type of blade has cutting edges machined spirally, and will cut in any direction. It can be adapted for use in standard hacksaws or coping saw frames, or in the form of a bandsaw. A special type of bandsaw machine will be seen in action, cutting complicated shapes in sheet metal or almost any other material.

Stuart Turner Ltd., Henley-on-Thames, Oxon.

Stuart specialities are so well known that they need no introduction to readers of THE MODEL ENGINEER. All the well-known Stuart designs for marine and stationary steam engines, also centrifugal and reciprocating type pumps, and internal combustion engines, boilers, fittings, locomotive wheels, etc., will be seen here.

THE MODEL ENGINEER. **Percival Marshall & Co. Ltd.,** 19-20, Noel Street, London, W.1.

All visitors to the Exhibition should make a special point of visiting the "M.E." stand and entering a special competition, details of which together with entry form, will be found in the Exhibition Catalogue, obtainable on this stand or in the entrance hall. For beginners to model engineering, the publishers are making



The Tyler Junior bandsaw for metal, wood, plastics, etc., by Spiral Saws Ltd.

special Exhibition Introductory Subscription offer of four copies for 2s. 6d.

S. Tyzack & Son Ltd., 341-345, Old Street, London, E.C.1.

This old-established firm of tool manufacturers and dealers is again exhibiting a full range of tools and equipment for the small workshop, including the Zyto 3⅜ in. screwcutting lathes, with attachments and accessories, also several other types of machine tools, hand tools and measuring instruments.

Walkers & Holtzapffel Ltd., 61, Baker Street, London, W.1.

This is another stand which the model railway enthusiast should not miss. Gauges "O" and "OO" are catered for especially, and the firm has a number of products of which it is either the manufacturer or sole distributor. Track parts and components are specialities, and the well-known and popular Romford mechanisms for locomotives need no special recommendation from us, as they have acquired a wide reputation during the years since the war.

The Web Model Fitting Co., 204, High Road, Wood Green, N.22.

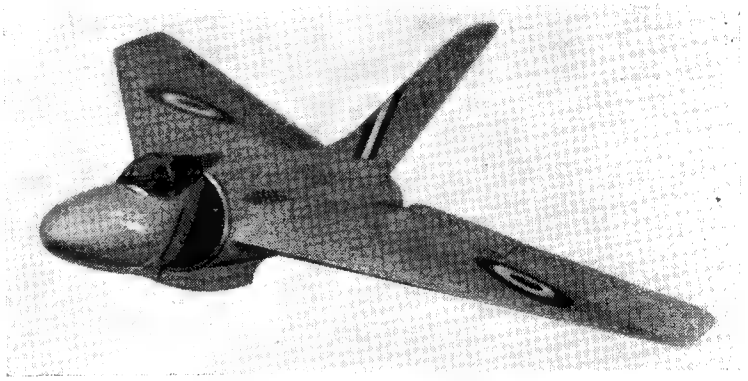
Specimens from the very wide range of fittings for all types of marine models, which are the speciality of this firm, are featured in this display. They include not only external fittings for deck and superstructure, correct to type and scale, for both steam and sailing craft, but also steam engines and boilers, steam fittings, engine components and propellers.

Wilmot, Mansour & Co. Ltd., Salisbury Road, Totton, Southampton.

The well-known Jetex manufacturers have on their stand several new items just in production, in addition to their established range of jet motors and accessories. The Jetex jet motor consists basically of a lightweight aluminium alloy case which can be loaded with a solid propellant charge, which, when ignited, provides a steady thrust from a jet orifice. It is ideally suited for providing the motive force for scale models of the new jet fighters.

Two items of outstanding interest on display are the new "Scorpion" with the best power-weight ratio of any motor in the Jetex range, and a new baby motor, the Atom 35. A new ready-to-fly model of a Delta wing intercepter fighter powered by the 50B motor, is also displayed.

A new addition to the 50B unit is an augmented tube which is made in three sections so that it can be joined together to make three alternative lengths of tube. The augmenter tube, forming a venturi aft of the motor, increases the thrust of the unit considerably. Also displayed on this stand are examples of some of the finest kits produced in this country. All the parts are beautifully die-cut from balsa wood.



A ready-to-fly Jetex powered model of a modern fighter aircraft exhibited by Wilmot, Mansour & Co. Ltd., on their stand

LOAN EXHIBITS

Model locomotives in this section include a 2-6-2 Class 2MT Ivatt tank locomotive in 5-in. gauge, of fabricated construction throughout, with the exception of the wheels, by Mr. E. R. Uphill, of Harrow; an 0-4-2 Stroudley "Gladstone" class locomotive in 3½-in. gauge, built from articles on "Locomotives Worth Modelling" in the "M.E.," by Mr. F. Watson, of London, S.W.16; and a tender for a G.N.R. 8 ft. single-wheeler in 3½-in. gauge, to the design of Mr. H. P. Jackson, built by Mr. C. G. S. Buist, of Alnmouth, Northumberland.

Mr. T. W. Geary, of Chiswick Park, London, W.4, who is well known for his turbine models, exhibits a steam turbine-driven winch, with clutch, brake and control lever for five winding drums. A home-constructed refrigerator, built from components by Messrs. Braid Bros., of Hackbridge, in french polished light oak cabinet, is exhibited by Mr. H. F. Birchall, of Southall, Middlesex. An example of the fine horological craftsmanship of Mr. C. B. Reeve, of Hastings, who is not exhibiting in the Competition Section this year, is the 8-day chiming and striking bracket clock in a burr walnut case, built to his own design.

Of current interest to readers is the exhibit by Mr. Lawrence H. Sparey, of Whetstone, London, N.20, namely, the research microscope now being described in detail in serial articles. This instrument, which was made entirely on a 3½ in. lathe, embodies all features found on high-class microscopes, including full mechanical stage and focussing substage.


"M.E." Personalities at the Exhibition
J.N. Maskelyne (Technical Editor)
E. Bowness (Maritime Editor)
E.T. Westbury (Technical Editor)
Bill Evans (Production)
By J. C. Anderson "M.E." Staff Artist
T.C. Page (Advertisement Manager)
E.F.H. Cosh (Managing Editor)

QUERIES AND REPLIES

"THE M.E." FREE ADVICE SERVICE. Queries from readers on matters connected with model engineering are replied to by post as promptly as possible. If considered of general interest the query and reply may also be published on this page. The following rules must, however, be complied with:

(1) Queries must be of a practical nature on subjects within the scope of this journal.
(2) Only queries which admit of a reasonably brief reply can be dealt with.
(3) Queries should not be sent under the same cover as any other communication.
(4) Queries involving the buying, selling, or valuation of models or equipment, or hypothetical queries such as examination questions, cannot be answered.
(5) A stamped addressed envelope must accompany each query.
(6) Envelopes must be marked "Query" and be addressed to THE MODEL ENGINEER, 19-20, Noel Street, London, W.1.

Batteries for Electric Launch

I recently obtained a 24-volt ex-R.A.F. electric motor, and wish to drive a model launch with it. I understand that this type of motor can be powered by 12-volt dry cell batteries, which will last several months. Do you think this is practicable, and have you any suggestions as to the best type of battery to use?

C.H. (Newbury).

Any type of battery can be used, so long as it supplies sufficient current to run the motor under load, and a suitable voltage for the performance required. Many of the ex-service motors now obtainable on the surplus market are initially designed for very high speed and power output at their maximum rated voltage, and will run on much lower voltages with correspondingly lower current consumption and also lower power.

As we do not know the exact current consumption of your motor under the particular conditions in which you propose to use it, we cannot advise you regarding the type of battery most suitable, but we suggest that you might try using four cycle-lamp batteries of two cells each, in series, to obtain 12 volts. If it should be found that the current consumption is too high for economical use of these batteries, the same number of cells of a larger size should be employed.

We could give you more definite advice on this subject if you could furnish us with the current consumption of the motor when run on 12 volts under load, as measured by an ammeter in series with the motor.

Electric Propulsion for Model Ship

I am proposing to build a working model ship driven electrically and deriving power from a 6-volt car battery. My previous experiments with this method of propulsion in metre boats have not been very successful, and I am thinking of building something on a larger scale. Can you please advise me on this subject, or inform me if it has been dealt with in a back number of THE MODEL ENGINEER.

L.H.K. (Hayling Island).

It is quite practicable to drive a model ship electrically, using a 6-volt car battery as the source of power; the only objection to this scheme is the weight of the battery, and unless the boat is fairly large, say about 6 ft. in length or more, we doubt whether it will have sufficient buoyancy to carry the smallest size of car battery available.

You do not state what motors you propose to use, but we may observe that the choice of suitable motors is rather restricted. You may be able to obtain motors suitable for a large model boat from Messrs. Bassett-Lowke, 112, High Holborn, London, W.C.1, or Bond's 'o Euston Road, 357, Euston Road, London, N.W.1. An alternative would be to use one of the small, but powerful electric motors now available on the surplus market, but most of these are wound for higher voltages, up to 24 volts, and would have to be rewound to run on 6 volts.

We have not described a large size electrically-driven boat in THE MODEL ENGINEER within recent years, and regret that we are unable to refer you to any detailed description of such a model.

Axial Cylinder Engines

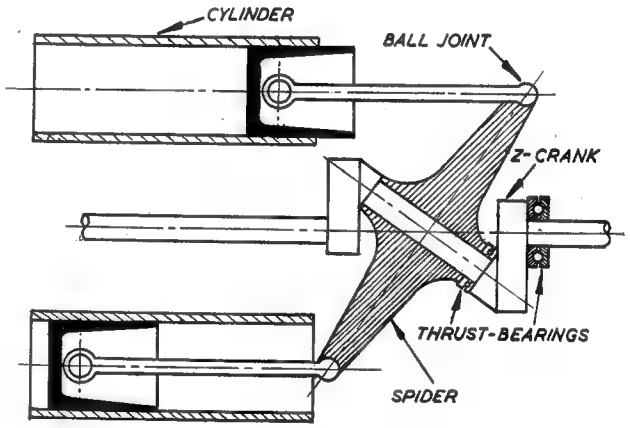
I am interested in the photograph of Mr. R. J. Harrison's engine in the issue of THE MODEL ENGINEER *dated June 18th and would like to attempt to make an engine with a similar axial cylinder arrangement, but I cannot understand the mechanism from the photograph. Will you please give me some advice on the principles on which these engines work?*

A.T.C.N. (Wexford).

There are several types of axial cylinder engines, including swashplate, track cam and Z-crank engines, and Mr. Harrison's engine was of the latter type.

Our diagram shows the working principle of the Z-crank axial engine, in which you will see that the inclined crank-pin, as it rotates, causes the arms of the spider to reciprocate. It should be mentioned that rotation of the spider is prevented by means of a keying device which is not shown in the drawing.

The pistons are connected to the extremities of the spider arms by means of connecting-rods with ball and socket joints, to allow for the compound tilting movement.



One of the practical difficulties in all types of axial engines is dealing with the end thrusts produced on the main shaft and also the oscillating or tilting member, and although many ingenious and moderately successful types of such engines have been produced, these problems have never been completely overcome. It may be mentioned that a drawing of a swashplate axial engine appears in the "M.E." Handbook *Flash Steam*, price 3s. 6d.

L.B.S.C.'s Titfield Thunderbolt

IN 3½ AND 5 INCH GAUGES

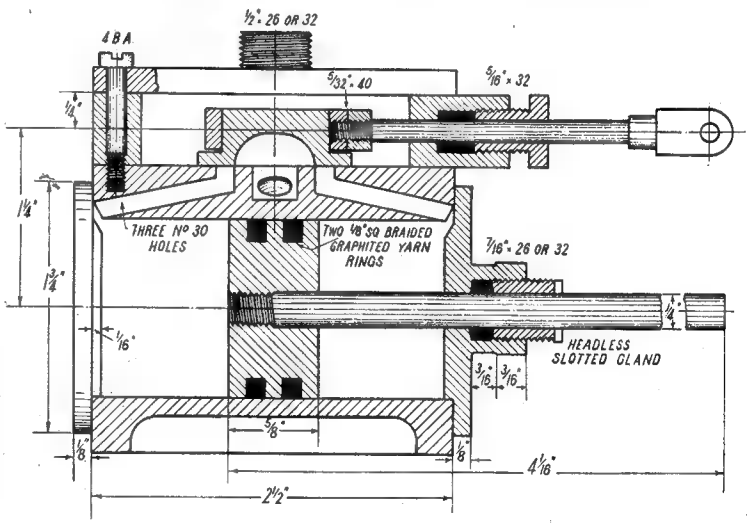
HERE are the cylinder drawings for the 5-in. gauge *Titfield Thunderbolt*, as promised last week. As mentioned at the time, the machining and fitting operations are practically the same in both 3½-in. and 5-in. gauge sizes, so no further description is needed ; but I might call attention to some slight variations in detail. The larger size pistons being ⅝ in. wide, two rings of ⅛ in. square braided graphited yarn can be used for packing, instead of one wide ring ; this allows an extra bearing surface between them. If separate stuffing-boxes are used on the steamchest, they can be screwed in as shown. The exhaust cavity in the cast valves, can be domed ; as a matter of fact, it can also be domed in the 3½-in. gauge size, but I showed it flat-topped in the drawings, as that form is easier to cut when the cavity is milled from the solid. The valve buckle should either be cast, or cut from ¼-in. plate, the boss either being formed integral, or silver-soldered on, the hole for the valve spindle being tapped through the full thickness of boss and buckle.

The big steamchest cover needs a central support, and this can be provided by a distance-piece screwed into the central hole in the cylinder casting, on the port face. The passage from the exhaust port to the central hole is drilled on the slant, by putting the drill down each exhaust port and drilling direct into the passage, as shown. Be careful to slope the drill sufficiently to clear the cylinder bore. The sharp angle where the drill breaks through, can be eased by putting another drill down the central hole, or using a file, or a reamer judiciously ; but this is not essential. The exhaust steam will find its way out quick enough, in any event, as the piston strokes of the fastest locomotive ever built, are not quite so rapid as those of a racing automobile engine. My experience has been, that as long as the "way out" is of adequate diameter, so as to avoid any chance of back pressure, corners in the pipes don't affect the efficiency at all.

A ½-in. clearing hole is drilled in the middle of the steamchest cover ; and this goes over the spigot at the top of the distance-piece. The exhaust pipe is silver-soldered into a glorified union nut, as shown, and the nut screwed tightly down on the spigot, clamping the cover tightly to the shoulder on the distance-piece. Put some plumbers' jointing paste on the threads. I don't think there is anything else on the 5-in. gauge cylinders that requires specially noting ; but anybody not quite clear on any point, and needing further information, has only to sing out, and I'll do my best to oblige.

Exhaust Injectors

A North Country reader sending an injector query, wants to know if I have ever made a small exhaust injector, and if so, am I going to describe it. As this matter has been referred to several times in correspondents' letters, I'll deal with it here, which will maybe save further inquiries. I have tried an exhaust injector, and it worked O.K. It was similar to the Davies and Metcalfe type B, and in effect, was two of my "standard" injectors connected "in series." The first part had cones with comparatively big throats, to utilise the low-pressure exhaust steam, and the second part had auxiliary cones arranged to give the water the final "kick," with a jet of live steam. A valve on the overflow had to be fitted, because the final delivery was above boiling-point, and flashed off into steam if the overflow pipe were left open. It was no trouble to make the injector ; that was easy enough, only requiring a little common-sense, but the big wasp in the jampot was the oily delivery. When using red-hot steam with non-ferrous cylinders and valves, it is necessary to flood the cylinders with oil, in a manner of speaking, to prevent the scoring of bores and port faces; and the exhaust is naturally pretty greasy. Oil in the boiler is something to be avoided, as it causes priming, bad steaming, and other troubles. All full-size locomotives with exhaust steam injectors are provided with an oil separator in the connection between the blast-pipe and the injector; and as they only use a



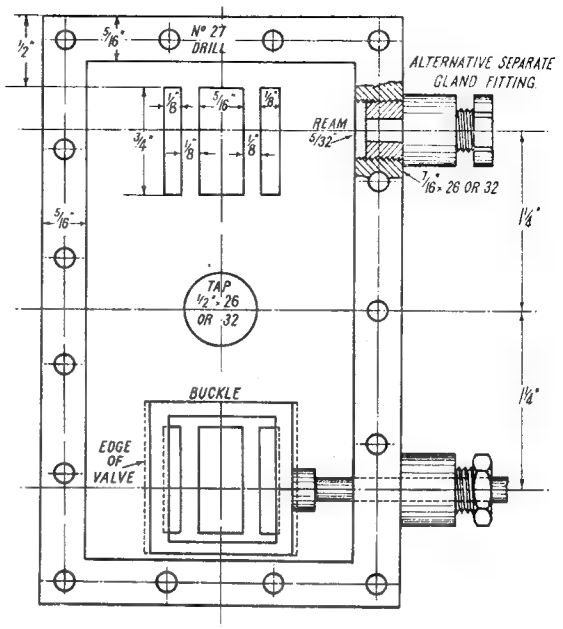
Section of cylinder

comparative fraction of the oil needed by their small sisters, the separator effectually removes what little goes through the exhaust.

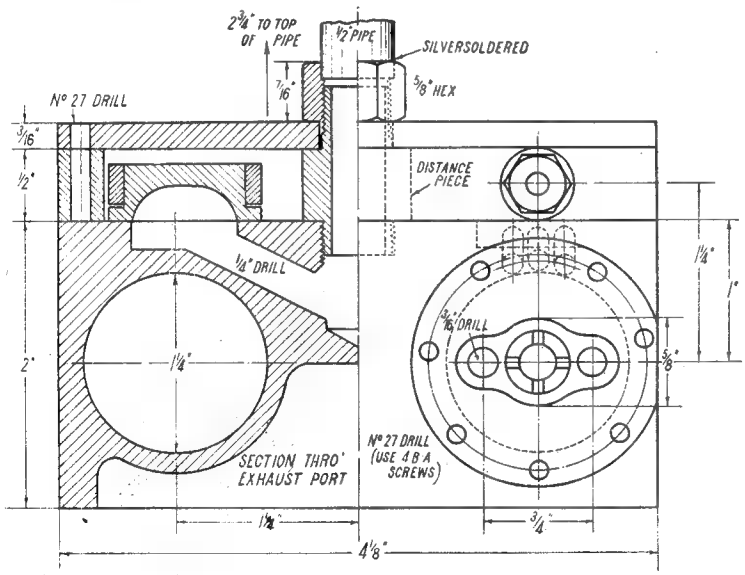
I copied this arrangement in the small size, but it didn't pan out at all well. The separator just choked in the proverbial five minutes. Absorbent towelling just soaked up the oil, and became sodden. Fine-mesh gauze simply choked up, and blocked the passage of steam. Try ■ I would, I couldn't get oil-free exhaust steam to the injector ; and as the ordinary live-steam injectors do all that I need, I didn't waste any more time on the bluepencil separator, life being now all too short to do all I want.

Self-lubricating Cylinders ?

At the time I tried the injector, Mr. Holcroft, of valve-gear fame, who was second-in-command to Mr. Maunsell for many years on the old Southern Railway (and wouldn't all the old Southern enginemen love to have the Maunsell-Holcroft-Clayton team running the show again !) gave me some valuable information about separators, and installation of exhaust injectors ; but when I told him that the excessively oily exhaust seemed to be an insuperable problem, he said,



Port face and steam chest



Part section and back end

why not do away with the oil altogether ? The Morgan Crucible Company, in its advertisements in the various railway journals, stated that air pumps used for compressing air which had to be absolutely oil-free, could be fitted with carbon pistons, requiring no lubrication whatever. Mr. Holcroft suggested that if I wrote to the Morgan Crucible Company and put my problem to them, they might be able to supply ■ grade of carbon that could be used for pistons and valves in small non-ferrous cylinders, and run without any lubrication at all. Well, I did just that; and after ■ while, Morgan's sent me six pieces of ■ specially-made carbon, at ■ cost of 15s., which they said would do the needful. What with life's hectic round, just one darn thing after another, like cleaning windows at the Crystal Palace, I haven't yet been able to carry out the oil-less cylinder experiment ; but I hope to do so in the not-too-distant future. However, I'll be perfectly frank and say right here, I don't think that either the carbon pistons and valves, or the cylinder bores and port faces, will survive with full efficiency for very long, under service conditions on my little railway ; but I'd try anything once, circumstances permitting, as I have always believed that the only *real* way to find things out is by actual experience. If I *can* get an absolutely oil-free exhaust, then the little working exhaust injector is a practical proposition ; and I'd fit one permanently on the engine with the carbon pistons and valves.

Off the Beaten Track

Whilst the following episode isn't exactly concerned with locomotive work, it will tickle those good folk who are always amused by Curly's unconventional antics. One evening there was a sudden crack, followed by a grinding noise, from the direction of the mantelshelf in our living-room. Curlylock Holmes immedi-

ately held an investigation, and discovered that the president of the Associated Society of Chime Clocks, Mr. Benjamin Bigge, of Westminster, S.W.1 ("Big Ben" to his pals) had apparently called an immediate non-strike; the member of his union, on the shelf, had quit work, and was silent. It had been in my possession for over 20 years, so I guessed it was about time it was given honourable retirement. Being up to my neck in the "Live Steam Notes" for the current week, I didn't at the moment attempt any examination of the clock's "giblets," to find out exactly what had happened, but thought it was about time that I invested in a new clock.

In that morning's newspaper, there had appeared the advertisement of a firm who supplied English clocks; it portrayed a man in bed, joyously waking up at the call of one of the firm's alarm clocks. My clock was a Jerry; I believe its place of birth was Nuremberg, so I thought I'd patronise home industries this time, and "buy British."

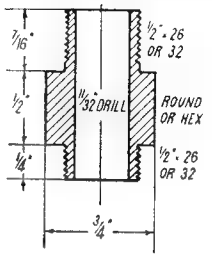
I therefore wrote to the advertising firm, asking their price for a really first-class Westminster chiming clock. Four days elapsed before I received a reply, and what on earth do you think they said? They could supply me with an alarm clock, or an electric clock, but they couldn't supply a chiming clock, *because I didn't keep a jewellery shop*! Can you beat that! I can understand a wholesale firm not being bothered with single customers, as that is regular trade practice; but when a firm advertise their goods in the manner referred to above, and then make is going all out, and decided to follow the good advice often given by Wilfred Pickles of radio fame, and "have a go" at repairing "old faithful."

Timing of Another Kind!

The "Live Steam Notes" for that week now being done, I got busy, and extracted the works from the clock case. First job was to let the springs down, and then carefully remove the wheels from the side of the frame which had the least. The nuts were then taken off the corner pillars, and the side plate removed, exposing all the wheels and spindles between. I then found that the spring driving the time mechanism had broken off about an inch from the end; and four of the teeth in the first gear were looking sick and sorry, one of them being broken off. Nothing else seemed amiss, except that 20 years' practically nonstop running had worn the bearings pretty considerably.

To avoid the delay which would have been inevitable if I had tried to get a new spring, I fixed the old one by joining the broken ends with a couple of 3/32-in. steel rivets; this was an easy job, as the spring was $\frac{11}{16}$ in. wide, and I punched the holes with a home-made punch intended for punching the spring-pin holes in working locomotive springs, resting the spring end on a block of lead. The spring coils were then well anointed with ball-bearing grease, and the spring replaced in the brass case; one job done.

The wheel was repaired in a simple manner, by first cutting out the defective teeth, and then filing out a dovetail in the rim below the space they occupied. In this space, I fitted a piece of 16-gauge brass, and silver-soldered it. The new teeth were filed by hand, which was much quicker than setting up the whole doings in the lathe, and cutting the teeth in the manner usually observed among professional clockmakers; although I would have had to do that if the whole wheel had "gone bust," as the kiddies would say. I still have a straight eye and a steady hand, despite the ravages of *anno Domini*; so all I had to do, was to slot out embryo teeth with a hacksaw, and



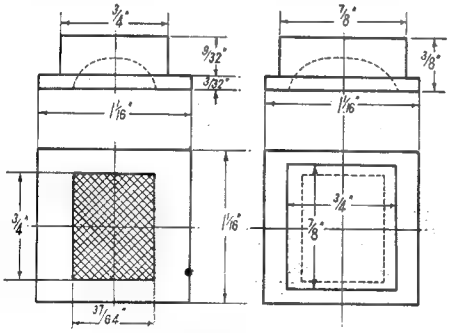
Distance-piece

finish them to outline with a fine flat file. I used a watchmakers' thin file with the teeth ground off one side for about 2 in. down; this avoided accidental damage to the side opposite to where I was filing. There wasn't much room to play about it! Anyway, the whole job only took about 20 minutes, from the time I performed the dental act on the old teeth, until four new bright and shining ones stood up in their place. I checked them for accuracy, by meshing with another wheel having teeth of the same size and pitch.

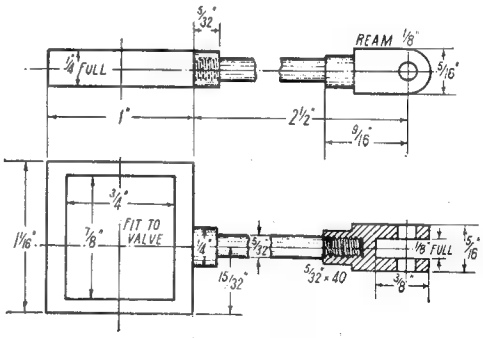
Some Job!

I'm telling you right here, that it was a bit of a wangle to get the side plate back on again, with all the spindles sticking up like prickles on a hedgehog's back. I guess that will amuse those of our readers who make or mend clocks as their daily vocation; but then I've never been initiated into the hidden mysteries and science of clockology, and just had to grope my way.

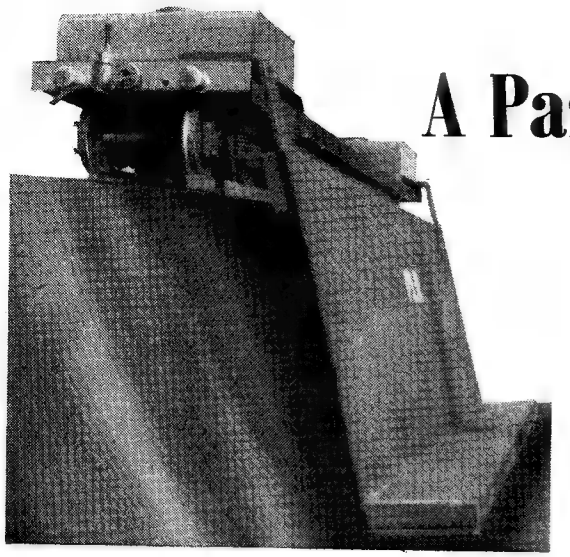
(*Continued on page* 232)



Slide valve



Buckle and spindle



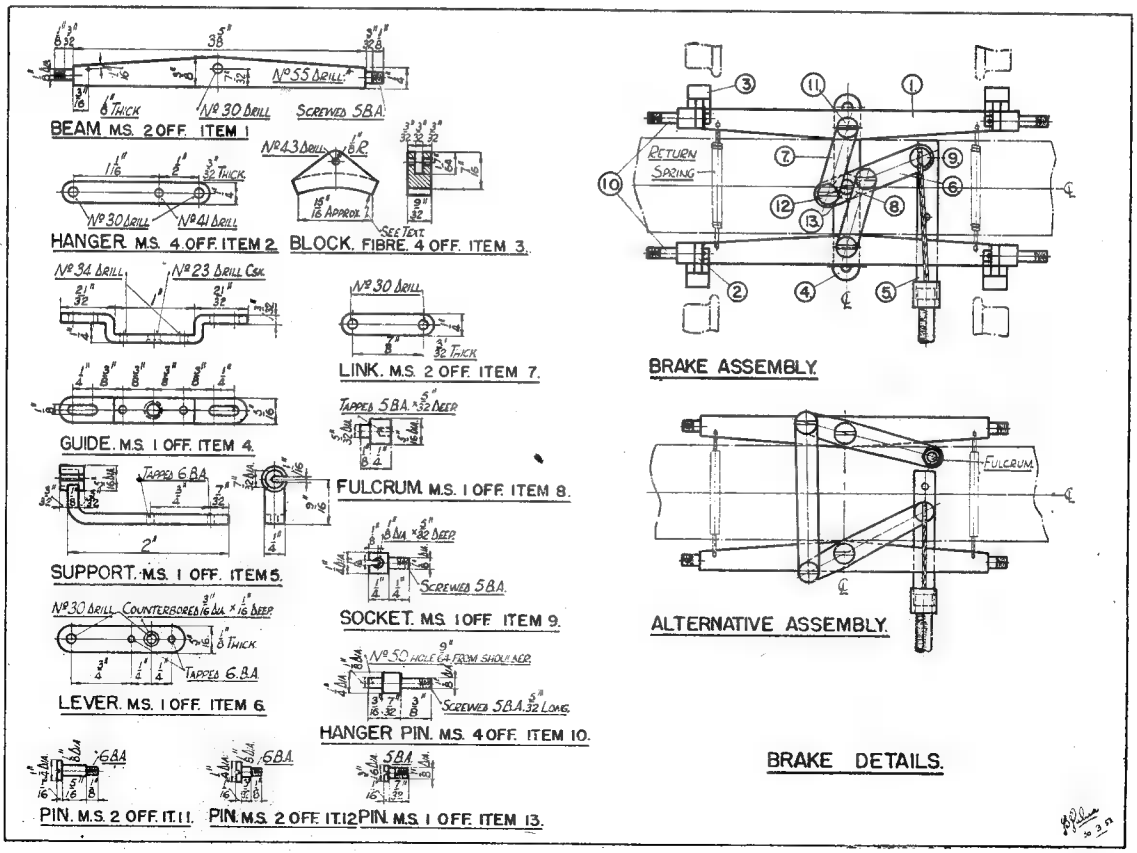
A Passenger Truck

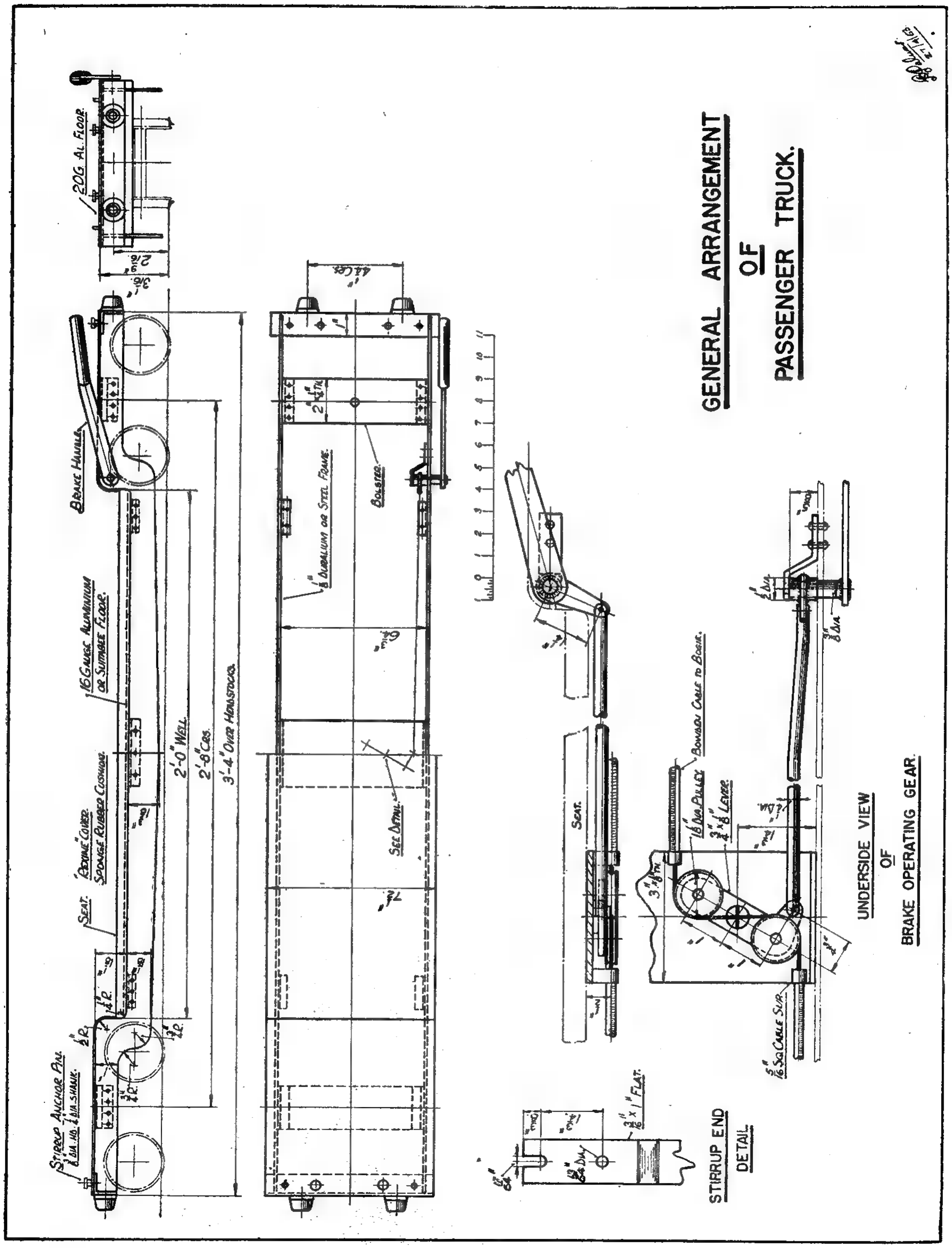
for 3½-in. gauge

By B. Palmer, Durban, (South Africa)

End view of the passenger truck for 3½-in. gauge railway

ON the completion of a 3½-in. gauge *P.V. Baker*, which. incidentally, was fortunate enough to be awarded a Highly Commended Diploma at the 1951 "M.E." Exhibition in London, and made the exciting and hurried trials with what facilities were available, viz. a makeshift four-wheeler truck, it was decided that it was high time that something better, better in performance, comfort and looks was forthcoming, in place of this "quadruped." There seems to be quite a divergence of opinion among the live-steam fraternity as to what exactly comprises a suitable passenger truck. Personally, I am at a loss to know why it is that "anything will do"; some of the vehicles used for the all-important job of conveying passengers and comfortably seating the drivers for hours on end have to be seen to be believed. The passenger trucks are, as we all know, a means to an end, but it is thought that to make a job at least comparable to the main subject of our carefully spent leisure hours, is well worth while.



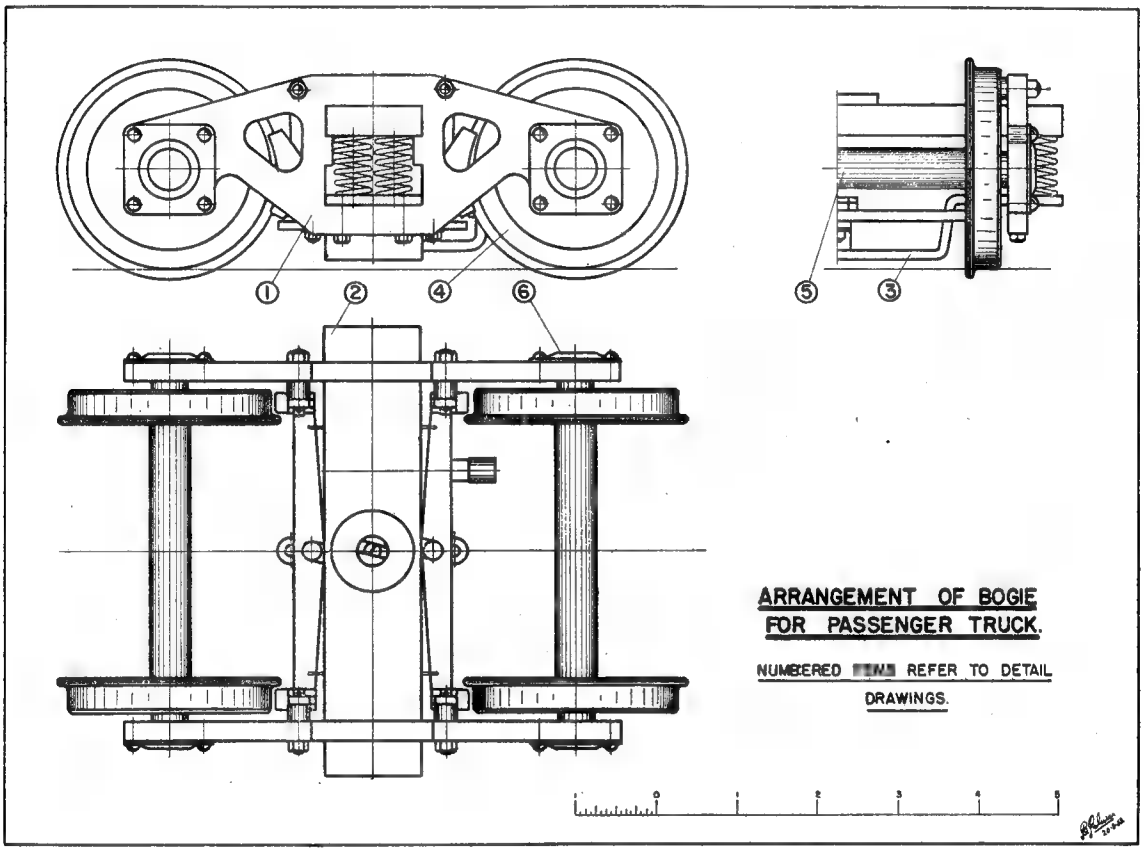

GENERAL ARRANGEMENT OF PASSENGER TRUCK.
UNDERSIDE VIEW OF BRAKE OPERATING GEAR.
STIRRUP END DETAIL

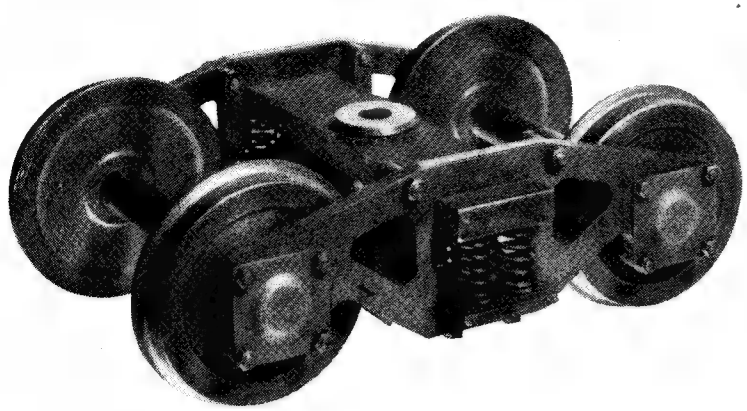
The truck described and illustrated is one that I constructed several years ago and has proved very satisfactory in service. The local live-steamers are very much in favour of proper foot or running boards with panels from top to bottom and end to end fitted to all passenger vehicles; it is safer for the children and certainly more comfortable for all concerned. In my case, the running boards are made detachable, for ease of transport. A very simple method, making use of two pins on the headstocks and a slot and clearance hole in each stirrup, as detailed, is used. A lift and outward pull of the foot-boards is all that is necessary to remove them from the truck. It will be appreciated that the length of the truck is an important factor when considering the fitting of these items, since in order to negotiate curved track a compromise between the length and overall width of the foot-boards is necessary, depending on the substructure of the raised track. Complete details of these particular items are not included; it is left to the reader to make his own choice *re* his requirements. Suggested sizes as used by myself are depth 15 in., width of foot-rest proper $3\frac{1}{2}$ in., and length to suit truck or track. A panel of hardboard or aluminium should be fitted to fill the space between the $\frac{3}{16}$ in. × 1 in. stirrup irons, truck seat and foot-rests.

Truck Frame

It will be noted from a study of the general arrangement and photographs that the truck is representative of the well-wagon type of prototype; it was chosen to lower the centre of gravity and also to make use of the platforms (portions above the bogies) for additional water tanks, not shown in the drawings, as the truck was to serve a tank locomotive. Complete working drawings are not given of the underframe, as many people will prefer the simpler flat type of vehicle; nevertheless, sufficient information is included for the construction of a similar passenger truck.

If light material (e.g. duralumin, etc.) is available, it is strongly recommended for the frame construction, as the weight thereby saved is well worth considering, if only from the point of view of transport of the truck. Otherwise, the frame incorporates friend "L.B.S.C.'s" proved and tested methods of construction. The vertical position of the bolster in the frame will have to be determined from the pivot arrangement. In my case, a second-hand "sealed type" of thrust-race of 1 in. bore and $\frac{5}{8}$ in. thickness was used as the pivot for each bogie; but plain brass or bronze bearing washers will do quite well, provided that pads are attached to the bolsters on each side of the centre pivot, in order to support the truck when tilted. Rollers, as per "L.B.S.C.'s" *Britannia* trailing truck arrangement, are, of course, very acceptable. These pads or rollers must have at least 1/32 in. clearance with the truck standing level. A pivot pin in the form of a shouldered stud $\frac{1}{2}$ in. diameter × $1\frac{5}{8}$ in. long (for a $\frac{5}{8}$ in. thick pivot bearing) threaded $\frac{3}{4}$ in.





B.S.F. for $\frac{3}{8}$ in. each end and reduced to $\frac{3}{8}$ in. diameter for $\frac{7}{8}$ in. one end, is screwed tightly into the frame bolster, and serves to retain the bogies in position.

Ordinary rubber door-stops have been used as buffers, as these are not prone to damage passengers or equipment. Substantial hooks and three-link chains are by far the most successful coupling arrangement, and the slack allows for individual truck derailments without undue alarm or damage. The fitting of a comfortable sponge-rubber seat will be appreciated by all, and a very simple detachable back-rest will add greatly to the easing of the driver's lot.

Bogie and Details

Complete detail drawings have been prepared for the bogies and, although essentially for 3½-in. gauge, it is a fairly simple matter to scale the drawings for suitable dimensions for any other gauge of bogie; allowances should be made for the strengths when considering the thickness of components. This does not apply to the brake gear. Item numbers have been allocated to the components to simplify the detailing and make the drawing self-explanatory.

Bogie Side Frames, Item 1

These items were cut from 2-in. × ¼-in. mild-steel flat bar; four pieces were temporarily riveted together and the major portion of material was removed by judicious drilling and filing. Cast-iron or bronze castings (not aluminium) will save a good deal of hard work and time, and the necessary pattern can be very simply made from a suitable piece of plywood. It is again recommended that a light alloy be used if available. The ball-race housings were simply produced by reaming with a standard expanding reamer, after drilling. The holes surrounding the housings are referred to later, when discussing the covers.

Bolster, Item 2

This is a straightforward job and, if preferred, 1¼ in. × ⅜ in. flat bar may be used, provided that the ends are reduced to $1\frac{3}{16}$ in. to facilitate assembly. The spring pockets should be large enough to allow a free fit of the springs. A bush of ⅜-in. bore with a large flange to form either a register for the thrust-race, or the pivot bearing proper, must be pressed into the ⅛ in. diameter hole.

Spring Tray, Item 3 and Spigot, Item 7

Apart from its legitimate job of supporting the nests of springs, this item serves a number of very useful purposes :—

(*a*) It assists in keeping the side frames at the correct distance and parallel ; (*b*) it is a suitable component from which the brake gear can be supported, and (*c*) very important this, in the event of a derailment the low slung centre portion in between the side frames prevents the truck dropping any distance, as the tray itself rides on the rail heads. Thus, damage is obviated to wheels, track and the passengers' " morale."

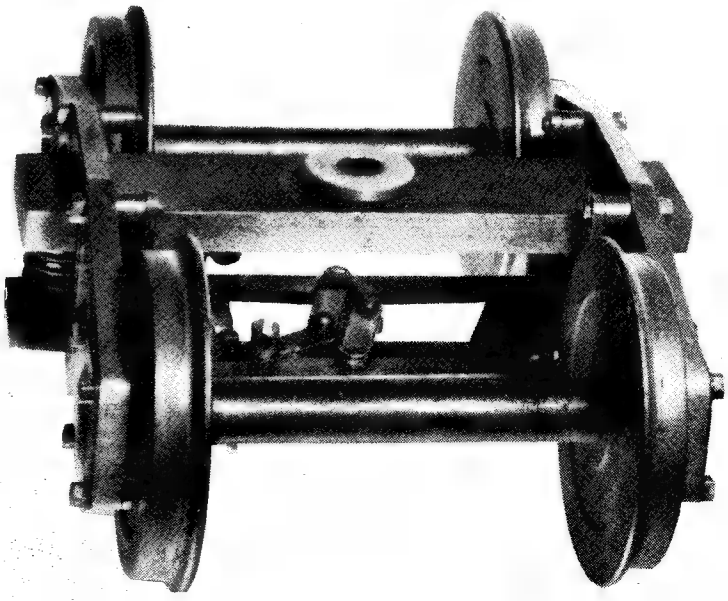
The construction is straightforward, the four 6-B.A. tapped holes must be marked off with the tray in position in the side frames. The eight spigots are riveted into position and serve to locate the springs.

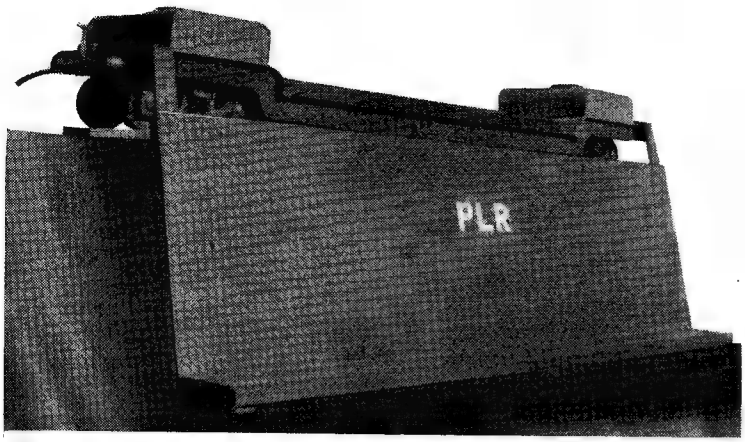
Wheels, Item 4, Axles, Item 5 and Bearings

This is a plain turning job with no frills, and it need not be mentioned that the wheel and ball-race seats should be turned in one setting or with the axle in between centres. A very light press-fit is all that is required of the ball-races on their respective seatings.

Covers, Item 6, and Ball-races

The covers can be pressed or knocked up from odd pieces of steel plate; should it be preferred, these can be machined from bar material, but the former are quite satisfactory. If the " sealed for life " type of bearing is available (*ex* war disposals) then there is no real need of a cover on the inside of the frame; but if the more readily available open type of ball-race is used, a





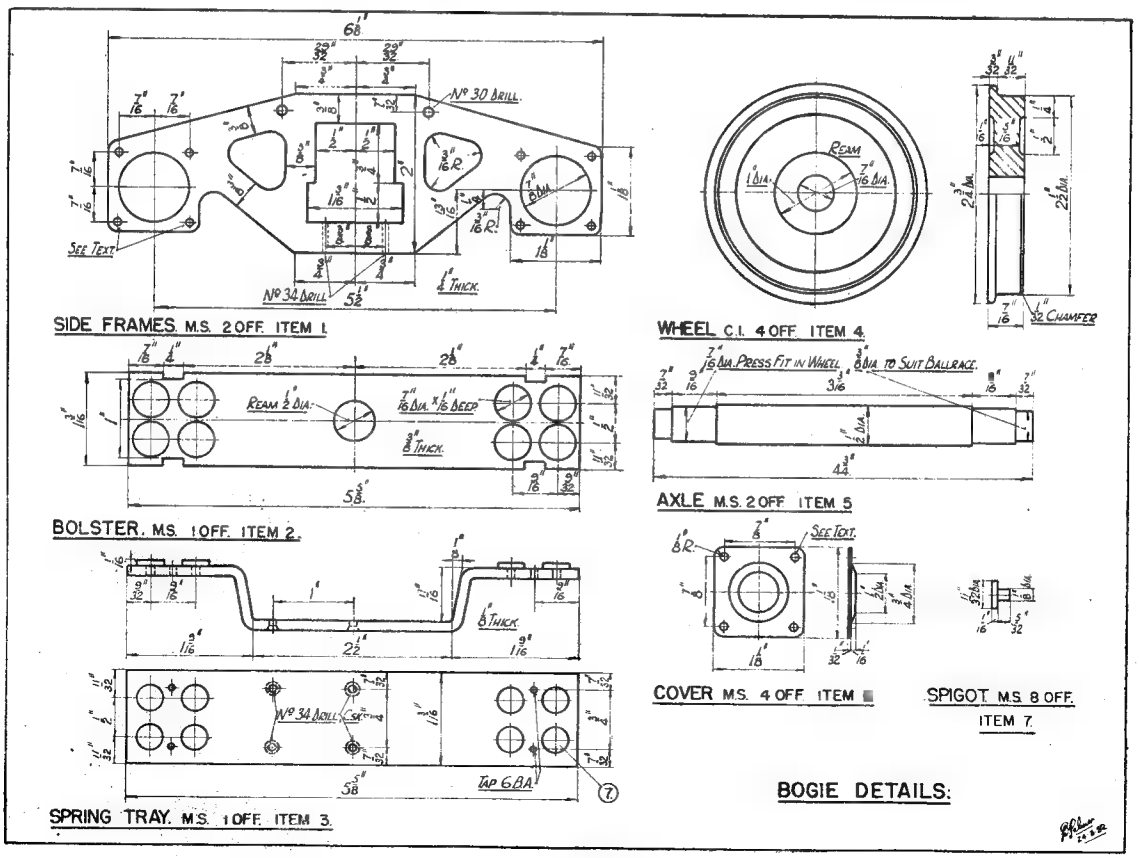
spigoted cover with close fitting hole around the axle is essential, to keep the dirt at bay. Although self-aligning bearings seem desirable with such a flexible frame, the truck has given eminently satisfactory service with the single-row rigid ball-races fitted. With regard to the holes in the covers and frames, should the single outside covers be used, then 3/32-in. rivets with snap heads outside or 6-B.A. hex.-headed screws are in order; but if two covers per housing are necessary, then bolts will be essential; the holes must be drilled according to the respective method adopted.

Springs

Eight springs $\frac{7}{16}$ in. outside diameter by $\frac{7}{8}$ in. free height containing seven complete coils, and wound from 16 or 18-gauge steel wire, depending on the load and condition of track, are required, per bogie.

Brake Details

The gear for operating the brakes is detailed separately and, here again, individual taste has decided me against preparing complete detail drawings. This arrangement though, is to be recommended, since it operates on the compensating principle, and is of a simple enough construction. A stretcher of $\frac{1}{8}$-in. plate in the centre of the wagon is the base to which the fulcrum (not less than $\frac{3}{8}$ in. diameter) of the $\frac{3}{4}$ in. $\times$ $\frac{1}{8}$ in. lever is attached. A washer, or preferably a flanged bush, to give a clearance of $\frac{1}{8}$ in. between baseplate and lever, is necessary. The fabric pulleys with ball-races *ex* war disposals make very nobby components for this item. The pins for the pulleys should be securely fixed to the lever. No other fixing but a light-press fit for the ball-race pulleys is necessary, but if plain brass pulleys are used, a



headed pin is obviously essential.

The Bowden cable running from the central operating gear, should have sufficient slack to allow for the free movement of the individual bogies. The brake handle which is brazed to ■ 1½ in. long × ⅜ in. diameter shaft, one end of which is reduced to ¼ in. diameter for ⅛ in., is placed conveniently at the right-hand front of the truck. The shaft passes through the frame at the centre of the ¾ in. radius, see drawing, and ■ lever to which has been brazed a ¼ in. diameter × ⅝ in. long boss is pinned to the shaft by means of two 3/32-in. taper-pins. A bracket or tail support of ½ in. × ⅛ in. B.M.S. drilled ¼ in. diameter for the shaft, is bent and riveted to the frame as shown.

Bogie Brakes

First, allow me to explain the use of ■ rather more complicated brake gear than is usual; the assembly drawings show the arrangement as in use together with the simpler and more correct alternative. As originally constructed, the brakes were operated by an hydraulic system, but, although partially successful, this was not practicable enough. The finer clearances between brake block and wheel necessary with this system, did not allow the dirt picked up off the rail to pass the blocks. Hence my reversion to the mechanically-operated brakes. Incidentally, the use of separate brake drums on the axles would have made a success of the above system, but this was thought to be complicating matters a little too much.

Having made up a good number of components for the hydraulic brake system, it was decided to make use of as many ■■ possible in the mechanical system now in use. Let me hasten to add that the braking as described is very effective and quite trouble free, but the alternative may, and rightly so, be preferred by some constructors.

The brake blocks should be turned in the form of ■ ring with inside diameter of 2½ in. and outside diameter of 3⅜ in., thickness 9/32 in. with ■ groove, 3/32 in. wide by a shade over ¼ in. deep around the centre of the outside. It is as well to radius one of the inside corners to suit the wheel. Eight equal brake blocks are cut from the so-formed ring, as per item 3, and eight silver-steel pins 3/32 in. diameter × 9/32 in. long will be required for the blocks. The fixing holes in items 4 and 5 must be "spotted" through from the holes already drilled in the spring tray, item 3 of the bogie detail drawing. It is advisable to make the screw threads of items 11, 12 and 13 on the tight side, as there is no locking provided for. Four springs wound from 20- or 22-gauge spring steel wire will be required for the purpose of returning the brakes to the "off" position. The Bowden cable is cut to length, suitable caps fitted to the ends of the casing, and ⅛ in. diameter nipples soldered to the ends of the wire cable, on completion of the general assembly.

Mention has been made recently in this magazine, of the possibility of fitting continuous braking, operated from the cab, to the passenger trucks. I have in mind a system, whereby I will make use of ■ Bowden cable running from the locomotive right through the "train"; the steam brake cylinder on the engine will supply the power, and simple but effective couplings on the cable will take care of the individual truck braking. The whole system will have to be compensated, and each truck will either have a spring connection to the "mains" or ■ simple lever arrangement.

In conclusion, I would like to suggest that the trucks be painted in the livery of the individual owner's railway or that of the society.

The two photographs of the bogies were taken by Whysalls Photographic Studio (Pty.) Ltd. of Durban, S.A.

L.B.S.C's Titfield Thunderbolt

(*Continued from page* 226)

Patience is a virtue, says the old saw; and by dint of putting one row of spikes in at ■ time, and then putting two of the nuts on two of the corner pillars, so that the side plate didn't jump up and let the lot loose again, I got them all in, and heaved a huge sigh of relief when the plate seated home with ■ final click. On tightening the pillar nuts, and winding the repaired time spring, the escapement gadget started to waggle like nobody's business, and I was as pleased as ■ dog with two tails when my four "patent" teeth sailed past the meshing pinion without the slightest hesitation. Then the fun began! In my struggle to replace the side plate, some of the wheels had shifted around ■ bit; and as they have pins in the spokes, to actuate the chiming and striking movements, you can guess what had happened. The chime hammers were all out of step, and the striking gear operated at any old place, when it decided to operate at all!

Well, thought Curly, I've set the valves and timing on many a locomotive, and am certainly not going to be jolly well stumped by any old antiquated bunch of clock wheels; and although I didn't know the first regular step to be taken in setting the chime-and-strike gear of a clock, I thought it was ■ case of "never too old to learn," so I tackled the job in the same way as I tackle one on a railway engine, by doing one thing at a time. I disconnected the striking gear and concentrated on the chiming gear, and soon found out how it operated; then, "setting the valves" in ■ manner of speaking, had the satisfaction of seeing the chime hammers operate in proper sequence. The striker was adjusted in similar fashion; then came the job of combining the two movements. First, I evidently got too much lead, for it started to strike early; then too much lap, causing "delayed action"; but after about half-an-hour, during which I learned more about timekeeping than ever I did on the railway, everything panned out O.K. I replaced the works in the case, put on the pendulum, and found that I had an uncle named Bob. Since then, the clock has worked fine, running well up to time, plenty of "steam," even "beats," and what-have-you; and as I write these words, the old so-and-so has just chimed four quarters and struck the hour, for all the world as if it knew I was telling the tale of its misdemeanour, and indulging in ■ chuckle at my expense!

Odoriferous Tail Lamp!

Since writing my explanation of the "stink-bomb" hot bearing detectors, I have heard from several drivers and firemen on both the L.M. and N.E. divisions, that both violets and aniseed are actually used. Maybe they are cheaper than amyl-acetate! Anyway, the use of the latter was given in information supplied to ■■ "straight from the horse's mouth"; and if it has been superseded, it makes no difference to the fact that such warnings are found necessary in present-day locomotive practice. But an engine smelling strongly of violets, is just one more bit of evidence that locomotives are really feminine!

THE ALLCHIN "M.E." TRACTION ENGINE

to 1½ in. Scale

By W. J. Hughes

HAVING machined the spur-wheel side of the compensating-centre, we can now proceed with the winding-drum side.

If your three-jaw chuck is big enough, you can grip the casting in the outside jaws of this, held by the spur-wheel spigot. But don't risk this if it means the jaws have to be nearly fully extended to do so—better use the four-jaw chuck. In this case, use either the machined outside diameter of the flange, or the bore of the boss, to assist in setting the casting to run true. If neither the three-jaw nor the four-jaw will grip the casting safely, it can be set up on the faceplate, gripped by three or four dogs over the flange. If, however, your faceplate is only 6 in. or so in diameter, this will not be possible, but you can drill four holes 17/64 in. dia. through the central flange as sketched, and use ¼ in. bolts—preferably cup-headed—to grip the casting to the plate. (The holes will be concealed later by the winding-drum.) In this case the spur-ring could be pressed home first (as described later), in order to support the outer flange when being turned.

Continued from page 80, *July* 16, 1953.

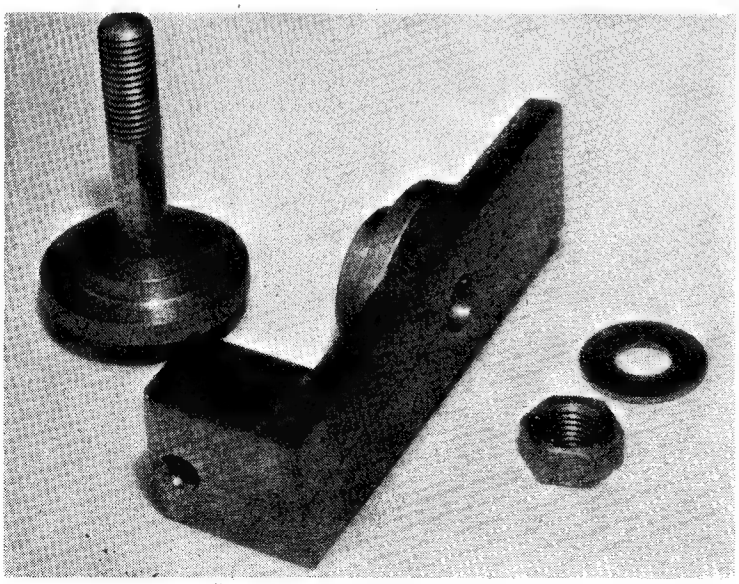
Machining the Winding-drum Side

Make a small sheet-metal gauge as sketched, and then, with a round-nosed tool set cross-wise, face back the central boss of the casting until the gauge just fits, as shown in the previous drawing. Exchange the round-nosed tool for a knife-tool (set normally)—preferably an offset one—and clean up the winding-drum boss and the flange. Hone the tool with an oil-slip, and face back the edge of the drum-boss until it is $\frac{3}{16}$ in. "outside" the central boss. This may be checked by putting a straight-edge across the former, and measuring from this to the latter.

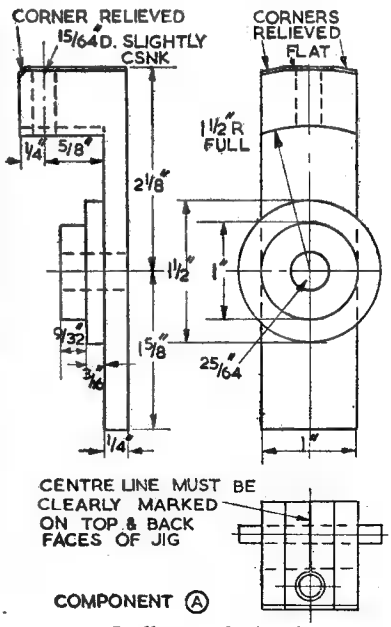
Now set the outside calipers to 3 in. and machine the drum-boss to diameter, at the same time taking its width to $\frac{7}{8}$ in. The *exact* diameter doesn't matter to a few thous., of course, because the drum itself will be bored to fit the boss, but get it as near as possible. Then use the surface-gauge, set at centre-height, to carry the lines marked across the other side of the work across *this* side of it.

Drilling Jig for Bevel-pins

It will be obvious that the pins on which the bevel-pinions are mounted must be not only truly radial, but their centre-lines must also be exactly on the same plane—that is, in this case they must be each exactly $\frac{7}{16}$ in. from the outer face of the central boss, and $\frac{5}{16}$ in. from the inner face. Otherwise the pinions will not mesh equally with the bevel-wheels, of course. In order to ensure this, it is advisable to jig-drill the holes, and the drawings and photographs show the jig



Photograph No. 39. Components of drilling-jig for bevel-pins



Drilling-jig for bevel-pins

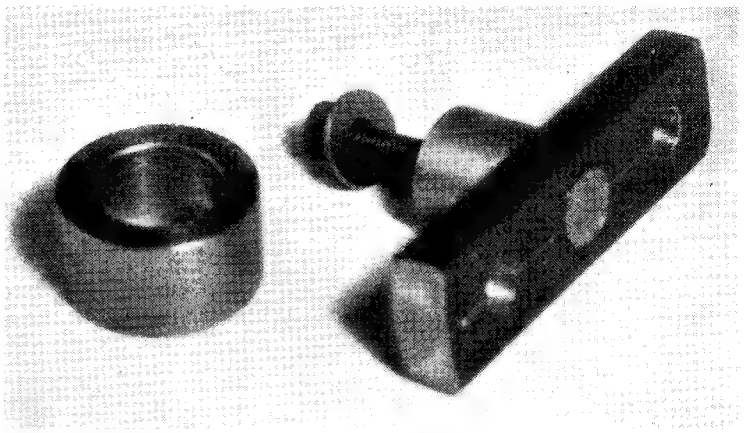
I used. The actual drill-guide, component *A*, *could* be fabricated, of course, and component *B* turned from steel bar, but I used iron castings, which Reeves can supply, as usual. To assist in machining this piece, a chucking-spigot has been cast on the outside face. Grip the *other* (inside) spigot in the three-jaw chuck, and take a cleaning-up cut over the outside face and chucking-spigot. Use slow back-gear, and because of the intermittent cut, "steady" the chuck by gripping it lightly with the left hand as it revolves. This takes out any back lash. Reverse the casting in the chuck, gripping by the chucking-spigot and making sure that the cleaned-up face of the job is right up to the outer face of the jaws. In machining this side, the diameter of the boss given as 1 in. should be made a good fit for the bore of the compensating centre, of course, and the face of the $1\frac{1}{2}$ in. dia. boss should be exactly $\frac{3}{16}$ in. from the face of the "arm" which carries the lug.

The curved inner face of the lug is best machined with a boring-tool, and the inner corner can be undercut *slightly* (as shown in the cross-section) to make sure that it will clear the outer corner of the winding-drum boss. The radius of the curve should be about 1/64 in. more than $1\frac{1}{2}$ in., so as to clear that of the boss, and the distance from the face of the arm to the face of the lug should be exactly $\frac{7}{8}$ in. You can also take a cleaning-up cut at $2\frac{1}{8}$ in. radius over the outside of the lug.

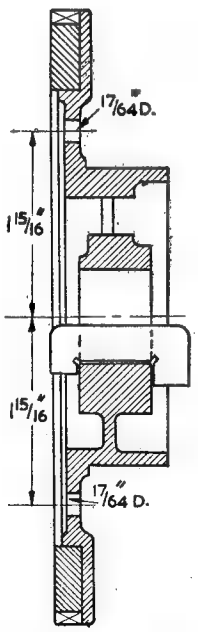
Now, whilst the work is still mounted in the chuck, set your surface-gauge exactly to centre height, and scribe a centre-line right down the work, which will be of assistance later on. Centre the boss, and drill it through at 25/64 in. diameter. You can then reverse it in the chuck again, gripping it by the boss, and turn off the chucking spigot, at the same time facing the outside surface off to $\frac{1}{4}$ in. away from the inner one. Remove the work from the chuck.

The flat on top of the jig is not vital, but it is easier to drill a hole from a flat than from a curved surface. It should be filed square with the outer surface. At the same time relieve the corners as shown.

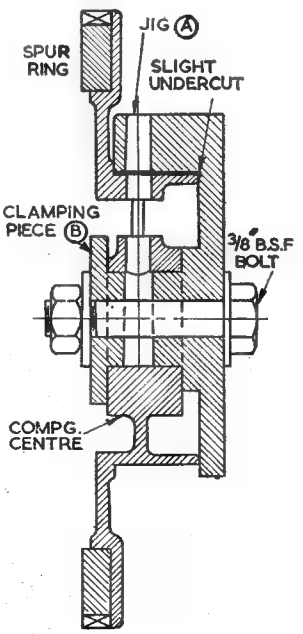
Now set the casting on the surface-plate so that the centre-line is parallel with the surface. This can be done by bolting the jig to a small angle-plate, and checking both ends of the line with the surface-gauge. Then use the latter to scribe the centre-line on the top and outer surfaces of the jig. With dividers, or oddlegs, you can now mark a line across the top and $\frac{1}{4}$ in. from the inner end of the lug, which will be equal to $\frac{5}{8}$ in. from the inner surface, and so be the centre for the



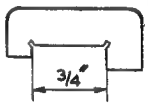
Photograph No. 41. Drilling-jig for locking-pin, with bush



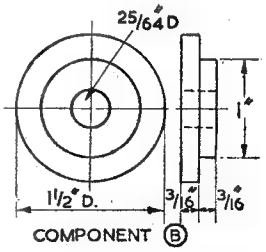
To show location of clamping-holes, and use of gauge on central boss



Assembly of drilling-jig



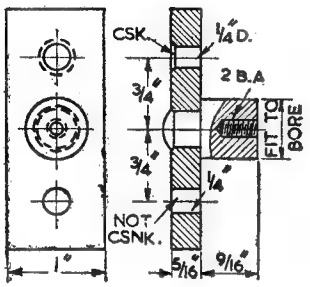
Gauge for thickness of boss



Clamping-plate for drilling-jig

jig-hole itself. Centre-pop very carefully at this point—use a magnifying glass to check the accuracy, and scribe a circle ¼ in. in diameter, to act as a guide when drilling.

Set the jig in the machine-vice so that the centre-line is vertical, and check for squareness the other way, too. With a small centre-drill in the drilling-machine chuck, make a small "dimple" at the marked



Drilling-jig for locking-pin

centre, and check with the glass again to see that it is dead central in the ¼-in. circle. If not, it will have to be "pulled" sideways with a centre-punch, small chisel, or with the centre-drill itself. Carry on with the latter to make a good deep centre, and then drill right through—take your time !—with a 5/32-in. drill. Follow this with a 7/32-in. and then with a 15/64-in. drill. Slightly countersink the top with a larger centre-drill, and the jig itself is finished.

The clamping-piece, component *B*, is a straightforward bit of turning : this casting has a chucking-piece, too. Grip this in the chuck, and turn up the two bosses—the 1 in. diameter which fits the bore of the compensating centre is the only vital dimension. Centre the boss, and drill 25/64 in. dia. Reverse in the chuck, turn away the chucking-spigot, and that's that.

Fitting the Spur-ring

Before drilling the holes, it is advisable to press home the spur-wheel on its seat (if not already done), because this will support the thin flange. In fact, it might not be a bad idea to do it before making the jig even ! But first drill the six No. 30 holes in the flange—they are set out on the six radial lines you have marked, at a distance of 7/16 in. from the edge. Don't bother to countersink the other side yet, but *do* remove all burr from the spur-wheel side.

With a triangular scraper or smooth file, remove the arris or sharp corner from the inside of the bore of the spur-wheel. Place the wheel over the spigot, place one side between the vice-jaws (with copper clams in position), and give a slight squeeze—about 1/32 in. Turn the work through 180 deg., and do the same the other side. Then carry on right round the wheel, turning it through about 45 deg. each time, and squeezing about 1/32 in. each time, until the ring is pressed right home. As you proceed, take care to keep the ring approximately parallel all the time, of course.

Using the Jig

Clamp the jig in position as shown in the section and in the photograph, and set it in line with one of the bevel pinion holes by lining up its centre-line with one of the lines on the flange. Check to see that the relieved corner of the jig does not foul the centre-casting at all, and tighten the clamping-bolt.

Set the work in the drilling-machine vice so that the centre-line of the jig is square with the table, and grip a 15/64-in. drill in the chuck. Line this up with the hole in the jig, and drill right through. The drill should be really keen, and used without forcing.

Remove the jig, but keep the work in the vice. Replace the drill with a ¼-in. dia. reamer, and ream out the hole *by hand*. That is, rotate the chuck with the left hand while feeding it gently with the right. Don't forget to keep it turning forwards while withdrawing it from the reamed hole. (Two pairs of hands are better than one here !)

When the first hole is done, the other two are merely repeat operations, of course.

There is very little work to do on the compensating-centre now. The bevel-pins will be held in place by three 6-B.A. Allen grub-screws—obtainable from Reeves—and the holes for these should be set out and tapped.

Lubrication

The three 3/32-in. holes for lubrication may also be drilled at this stage. Note that they go in at an angle, and so one side of the work will have to rest on a block while this is being done. The tops of the holes are countersunk. Pass the reamer through the pin-holes again after this.

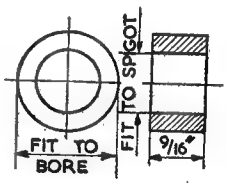
Incidentally, on many traction-engines the lubrication of the compensating-gear was very sketchy indeed : the recipe seemed to be to pack well with grease and forget ! It should be remembered, however, that (comparatively speaking) very little movement takes place here : the wear and tear is nothing like that on the other gearing ; and I think my arrangement should prove adequate.

The oil-holes will be easily get-at-able by withdrawing one of the hind-wheel driving-pins, and using a thin-spouted oilcan. The oil will not only lubricate the centre, but should find its way down the passages drilled in the bevel-pins, and then through those in the pinions to the teeth of the bevel wheels. In addition, the left-hand bevel, wheel can be lubricated direct through the driving-pin holes, and the oil will be carried to the other wheel by the pinions.

Jig for Drilling Locking-pin Holes

Reverting to the compensating-centre, the next job is to drill the three holes for the pin which is used to lock the differential in time of need. Here again, a jig is advisable, because these holes must be at *exactly* the same radius as those in the left-hand driving-boss and the left-hand hind wheel ; and, of course, the best way to ensure this is to make the jig interchangeable. The drawing and photographs show how this is done, by making the jig with a spigot which fits the bore of the left-hand driving-boss (viz. is the same diameter as the hind axle), and then making a bush to fit over this spigot, but with an external diameter to fit the bore of the compensating centre.

Take a piece of suitable flat bar—actual breadth and thickness are



Adaptor bush for jig

immaterial, but the latter should not be less than ¼ in.—about 2½ in. long, and scribe its centre-line. Centre-pop the centre of this, and with dividers set to ¾ in., mark the two other centres. Scribe ¼ in. circles here, and ⅜ in. circle in the middle, to act as drilling-guides.

Drill the holes carefully and accurately, and slightly countersink the ⅜ in. hole and *one* of the ¼ in. ones.

Grip a piece of $\frac{3}{4}$-in. M.S. bar in the three-jaw chuck, and turn down about an inch of it to be a good fit in the bore of the driving-boss. Futher reduce the end to be a press-fit in the $\frac{3}{8}$-in. hole of the bar : the length of this reduced part should be about 1/64 in. more than the thickness of the bar.

Part off the piece, reverse in the chuck, and round off the sharp corner slightly with a file. Centre the end, drill No. 21 to a depth of $\frac{1}{2}$ in., and tap 2 B.A.

Mount a piece of $1\frac{1}{8}$ in. or $1\frac{1}{4}$ in. dia. bar (steel or brass) in the chuck, and reduce for about $\frac{3}{4}$ in. length to be a good fit in the bore of the compensating centre. Centre the end, drill up to $\frac{1}{2}$ in. dia. and $\frac{3}{4}$ in. deep, and bore out to be a good fit on the spigot you have just made. Part off to $\frac{9}{16}$ in. long, and remove all sharp arrises.

Press the $\frac{3}{8}$-in. spigot into the central hole in the bar, and lightly rivet over the top.

Drilling the Locking-pin Holes

To use the jig, fit the bush over the spigot, and insert it into the bore of the centre, on the spur-wheel side. In the bore on the other side fit the clamping-piece (*B*) of the other jig, and clamp the two together with a 2-B.A. screw and washer, not too tight at first.

Turn the jig until the countersunk hole is over one of the bosses to be drilled, with the centre-lines of both coinciding. Tighten the clamping-screw, and check to see that the jig has not moved. Now with parallel packing under the centre, to clear the clamping-screw from the machine-table—I used the jaws of my big machine-vice, as you can see—the hole can be drilled through. Don't forget : a keen drill and no forcing, please !

Repeat the dose twice more, and then in each case follow through with a 17/64-in. drill, *without* the jig, of course !

Final Operations

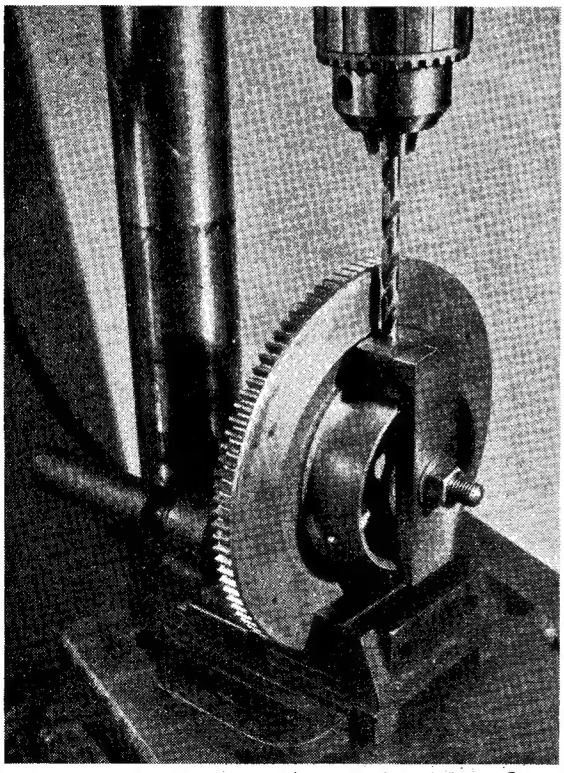
To make clearance for the teeth of the bevel wheels, we have to turn away part of these three bosses or lugs on both sides, which is easily done. But don't be tempted to "save time" by turning them on a previous set-up, because if so (as experienced workers will realise) you would then have a dickens of a job getting the holes through !

Grip the centre in the three-jaw by means of the winding-drum boss, and turn off the outsides of the three bosses to a depth of $\frac{3}{16}$ in., as indicated by the dotted lines in the section of the centre (last instalment). Press the right-hand bevel wheel on to the *outside* spigot of the right-hand wheel-centre, as with the other gears, and try it in place to see that the teeth do actually clear. If not, turn a little more away as required. You may also find it necessary to turn a very little off the three tiny bosses which hold the grub-screws securing the bevel-pins.

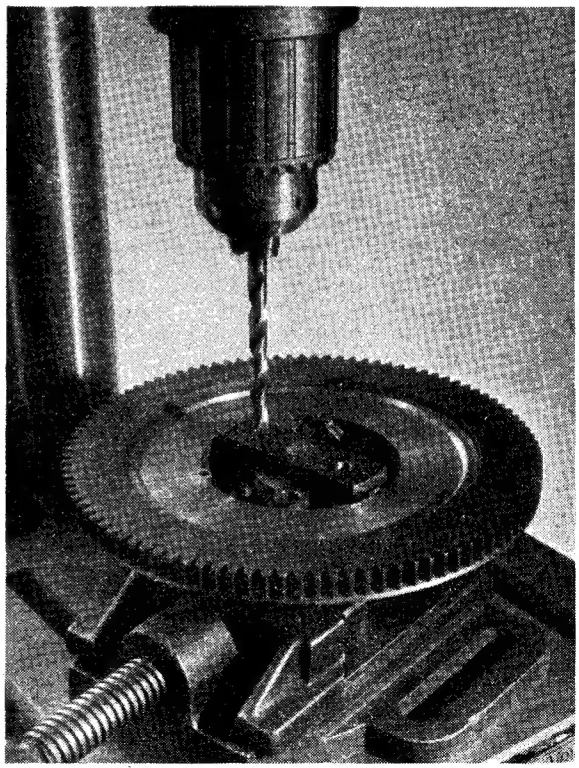
To turn the surplus away on the other side, it will be necessary to clip the casting, gear-side inwards, of course, to the faceplate.

Set the job to run perfectly true, and then turn away part of the lugs as before, but this time to a depth of $\frac{6}{16}$ in. Press the left-hand bevel-wheel on to its seat on the left-hand driving-boss, and check to see that the teeth clear on this side of the centre. If not, you know what to do.

(*To be continued*)

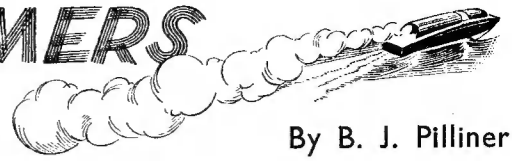


Photograph No. 40. *Drilling-jig in use*



Photograph No. 42. *Drilling locking-pin holes*

FLASH STEAMERS



● A CHRONICLE OF EXPERIMENTS, TRIALS AND TRIBULATIONS

By B. J. Pilliner

THE silencer on *Frolic* serves a dual purpose by covering the engine compartment and shielding it from the flames emitted by the boiler. The crankcase breather and exhaust are piped into the underside and there is a row of outlet ports at the back. The steam is baffled so that it has to flow in contact with the entire top surface, cooling and protecting it from the heat of the flames. Construction is by spotwelding from 0.009 in. stainless steel, the assembly being held in position by side clips. Water pressure is liable to tear it off on a "flip", and the last to be made was secured with a length of 80 lb. line. This precaution was useless, and I now have three silencers—all in different ponds!

"Frolic" fitted with aerofoil, and with engine offset to near side

Plant Layout. Engine Forward or Aft?

The aft engine position and flywheel propeller were adopted for the following reasons. Elimination of prop shaft, universals, tail shaft and skeg, giving a saving in weight and gain in mechanical efficiency. This layout was also later found to be more suitable for airflow into the boiler.

Points against are:—

(a) Centre of gravity moved back.
(b) Strong lift from propeller apparent when accelerating, making it necessary to move front planes forward, to prevent back end kicking off the water. With front planes in this position, the boat bounces badly at speed on any but smooth water.
(c) Considerably increased stresses on propeller and shaft.
(d) Vertical transom necessary with existing engine.

A compromise between the layout of *Ginger* and *Frolic* may be an advantage. The idea is to retain the rear engine position and lengthen the boat, to allow a short shaft to a more conventional surface prop, at the same time fairing off the back end. This also brings the c.g. to a more suitable position.

Propellers

Propeller pitch has been steadily increased as speeds rose, generally with the idea of keeping the engine and pumps to a reasonable speed. A strong side thrust is produced when starting, and results in a "slew" at perhaps 45 deg. to the line for the first few yards. If the boat is started on too little power, or has insufficient lateral resistance at the back end, a start can be impossible for this reason.

"Pitched" Propellers

For some time all propellers have been "pitched" with the aid of a helical gauge described in THE MODEL ENGINEER some time ago. The general method used is to slot the boss at the correct angle for the blades, braze in blades in the flat, and then work from the root outwards on each blade in turn with two bending irons, checking frequently with the gauge. The thrust face is made to a helix of the required pitch to an accuracy at any point of approx. 0.015 in. A little filing is occasionally required, but this method is quite speedy after some practice with the bending irons. The general taper to the tips, and the feathering-off of the edges to the blade section, is then done by offhand grinding and filing of the back face. By "back face" is meant the trailing face in the direction of rotation.

Blade Section.—Earlier propellers were made with the back face cambered to feather off at leading and trailing edges; the last to be made with this form being the surface prop for *Ginger*. Up to that time no material tougher than mild steel or annealed ground stock had been used, and no failures had occurred. Increased blade stress was anticipated with the flywheel-propeller of *Frolic*, the blades of which are in the water for a much smaller angle of rotation, and drive the boat by a series of disconnected impulses. Distinct advantages were seen in the type of blade which is feathered only to the leading edge, although it has, of course, a general taper in thickness from the boss to the tip. This blade can be designed to be stronger against bending, and also to have a smaller angle in section between the two faces of the blade at the leading edge. (I see I am beginning to theorise somewhat on this subject, on which very little that is useful is seen in print. Perhaps someone with more definite knowledge of these propellers will be tempted to give their opinion.)

Concluded from page 152, August 6, 1953.

This angle in section at the leading edge appears to be important, as it controls the minimum pitch on the back face of the blade, which should be not less than a certain percentage (depending on the true slip), of the pitch of the driving face. For example, assuming that a propeller of 10 in. pitch drives at 8 in., then the maximum pitch of the back face should be not less than 8 in. If it is less, then the leading part of the back face will be exerting thrust on the water and tending to push the boat backwards. (This should be avoided, as " boats that go backwards " are likely to raise comment !) When conforming to the above theory, the maximum leading edge angle is progressively reduced from the root to the tip, and propellers of fine attack angles (large ratio of diameter to pitch), cannot have such strong blades as those with coarse angles.

More Drag ?

Another point of interest is whether the squared-off trailing edge produces more drag than a feathered-off edge. The back of the blade near the feathered trailing edge has a greater pitch than the thrust face, and to take advantage of the streamlined section at this point, it is necessary for the water to remain in contact with it. It can only do so if it is accelerated backwards as the back face of the blade, with its increasing pitch, passes by. There does not appear to be sufficient pressure at the depth at which a small fast propeller operates to produce the necessary acceleration, which leads one to the conclusion that whatever the section of the blade may be, it leaves a channel in the water which fills in after the blade has passed. If this is correct, then the " streamlined " blade has no less drag while it is in the water than the blade with the square trailing edge.

However, to return to *Frolic*—which has " wrapped up " more blades than I care to count. All blades were made with square trailing edges, and after repeated failures of $\frac{1}{8}$ in. ground stock blades, a change was made to an alloy steel. I have no particulars of this steel, which is toughened by water quenching and will then take at least twice the stress of a soft ground stock blade before bending. The manufacturing method was varied to suit, and blades were " pitched " and finished while clamped in a dummy boss. They were then quenched at red heat from the brazing. Two-, and three-bladed propellers have been used, the dimensions of the last version being: pitch $10\frac{1}{4}$ in., diameter $5\frac{3}{4}$ in., boss (flywheel) diameter $2\frac{3}{4}$ in., blade width 0.78 in. from root to tip (square corners at tip), number of blades two, weight 12 oz. The distance from water level to shaft centre when running is 2 in. This propeller is not entirely satisfactory, as the blades still bend to some extent when the boat bounces badly or " flips." Further stiffening of the blades would probably result in crankshaft failure. It throws a moderate amount of water in the air compared with earlier props fitted to *Frolic*, which in spite of their impressive diameter, suffered from lack of blade area.

Figures (Without Facts)

From time to time (usually when some item of the plant failed), attempts have been made to estimate such things as steam pressure and the various efficiencies. In the absence of bench test data, these are based, to a large extent, on deduction (another name for guesswork), and may be very misleading. At some future time I hope to obtain data on the bench; the following figures are given merely as a matter of interest and some are probably very wide of the mark.

Boat speed 60 m.p.h., 88 ft./sec.

Propeller $10\frac{1}{4}$ in. pitch, assumed driving at 8 in. effective pitch.

Engine r.p.m., 7,920. Pumps, r.p.m., 2,830.

Fuel

Pump 0.187 in. bore × 0.2 in. stroke, 0.0055 cu. in.

Volume per min. at 100 per cent. volumetric efficiency, 15.6 cu. in.

Weight per min. at 0.77 sp. gr., 0.43 lb.

Total energy per min. at 20,000 B.Th.U.s per lb., 8,600 B.Th.U.s.

Water

Pump 0.281 in. bore × 0.5 in. stroke, 0.031 cu. in.

Volume per minute at 90 per cent. volumetric efficiency, 79 cu. in.

Weight per hour, 171 lb.

Weight per b.h.p. hour, 57 lb.

Evaporation per sq. ft. of boiler per hour, 79 lb.

Steam

Assume at 500 lb. per sq. in. and 600 deg. F.

Energy per minute, 3,700 B.Th.U.s.

Overall lamp and boiler efficiency, 43 per cent.

Engine

Assume 3 b.h.p.

At 7,920 r.p.m. b.m.e.p., 192 lb./sq. in.

Calculated weight of steam per hour at 40 per cent. cut off, including clearance volume and neglecting losses, 95 lb.

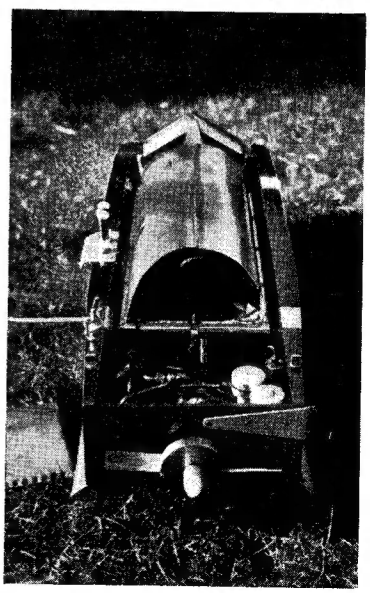
The total energy in the fuel is equivalent to approximately 200 h.p., at the rate used, producing what is perhaps an optimistic 3 b.h.p. Overall efficiency on these figures = $1\frac{1}{2}$ per cent.

Results on the Water

A general survey of these show that a boat of moderate speed, which is sufficiently stable and mechanically reliable to finish the course, can get results in regattas, *Ginger* conformed to this description at one time in 1947, and in five regattas in which it was run successively, gave the following results: Average of best run in each regatta 35.7 m.p.h. Placings, three firsts, two thirds, eight runs completed out of ten.

At no other period has one of these boats given consistent regatta results, Increases in speed have usually been accompanied by a series of mechanical failures, or by instability. Before being converted to surface propulsion, *Ginger* was pushed up to a maximum lap speed of about 44 m.p.h., at which it would invariably dive. When surface planing, with the plant unchanged, the maximum lap speed was raised by 9 m.p.h.

Frolic has been run for two seasons and for a long time gave very indifferent results. Then, after the air intake alteration, occurred one of those " inspired " runs of which only flash steam seems capable, the



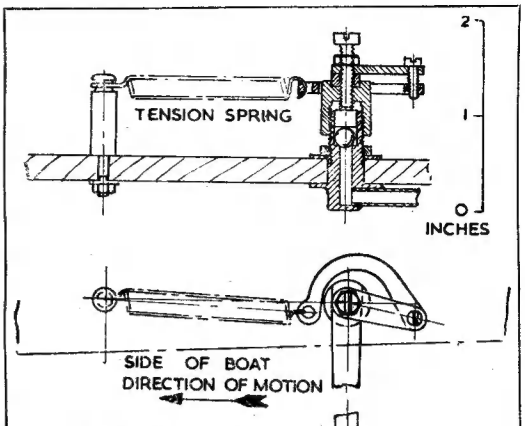
" *Frolic*," *as launched*

boat coming to life and reaching 10 m.p.h. above my highest hopes. One picks up the wreckage (the damage is a minor detail), and plans the coming season. Just slow it down a little to avoid the "flip," or what is wrong with an aerofoil on the front to hold it down? Plenty! Progress sends in its bill—the boat is allergic to any concrete edged pond on which it bounces and "flips" at round about 50 m.p.h., and the aerofoil is torn off and chopped up by the propeller.

After going through the usual phases, from desperation to perspiration, the boat is pulled up on the nearside edge to lessen planing area when running and retain it for starting. The engine is moved to the nearside to keep the prop in the water and the plant reshuffled to suit. A fin is fitted under the offside to reduce the increased starting slew (lifted from the water) when running. The result. No better—probably worse. More "getaway" trouble, loss of speed due to increased planing resistance, less bounce—but "flip" now due to boat "nosing in" with consequent increased air lift. (Mr. C . . .'s boat goes by running on the nearside edge—it might be on the rails.)

Put it all back again! The flip has gone on smooth water, because the boat starts fading at 60-65 m.p.h. instead of going on up as before. What is the difference? Probably fuel pump trouble again. Perhaps they are really putting petrol back into Pool.

Well, that's how it goes! The exasperating, fascinating, flash steamer. A new hull with less air lift, less air resistance, and c.g. further forward may be the current answer, and *Frolic*, like the others, will have made its exit.



"Frolic"—Water pressure release valve. Materials: Valve body—brass; Cap and levers—dural

WITH THE CLUBS

The Tyneside S.M.E.E.

There will be no ordinary meeting of the society during August. The next meeting will be on Saturday, September 5th, at 2.45 p.m., in the rooms of the Newcastle Photographic Society, Rutherford Street, when Mr. J. E. C. Stringer will talk on "Oil and the Model Engineer."

Hon. Secretary: L. JAMIESON, 34, Dorcas Avenue, Pendower, Newcastle-upon-Tyne, 5.

The West Riding S.L.S.

Public track days at Blackgates track, Bradford Road, Tingley, nr. Wakefield, will be held on August 30th, and September 13th. Light refreshments available 2.30 p.m. each day.

Applications for membership of W.R.S.L.S. welcomed from owners or builders of small locomotives.

Hon. Secretary: D. HOLLINGS, 8, Limetree Grove, Birkenshaw, Bradford. Tel.: Dudley Hill 299.

The Bristol Railway Circle

The club is organising an exhibition featuring the British Railways "O" gauge model railway at the Shepherds Hall, Old Market Street, Bristol, from October 3rd-17th (Sundays excepted). 10 a.m. to 9 p.m.

Further details may be obtained from the Hon. Secretary, J. F. BURRELL, 80, Longmead Avenue, Bristol, 7.

Blenheim M.E.E.S., New Zealand

The annual general meeting of the Blenheim Model and Experimental Engineers' Society was held at the society's new headquarters on July 15th, and was well attended. In opening the meeting the president, Mr. E. J. Speight, paid tribute to the late Mr. H. B. (Peter) Goulter, a foundation member of the society, and the members stood in silence as a mark of respect.

The president's report outlined the society's activities during the past year and mentioned, as the outstanding event, the display of models at the last A. & P. show which had been staged at short notice. Steps were already being taken to organise an exhibition at the forthcoming A. & P. show, and it was hoped that, with the longer time for preparations, a much more comprehensive and interesting display would be staged. The society aimed, he said, at providing itself with a satisfactory clubroom, also the building of a model railway track, and all members were asked to co-operate in attaining these objects.

Mr. Adam Gibson has presented a fine set of sheet metal bending rolls, made to the design of G. T. East in THE MODEL ENGINEER November, 1941. He has also presented a quantity of model engine parts and back numbers of the "M.E."

Offers of other material and equipment for the new clubroom were made by several members.

Hon. Secretary: J. E. ROBINSON, Scotland Street, Picton, New Zealand.

THE MODEL ENGINEER DIARY

August 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 29th.—Newton Abbot and District Model Engineering Society.—Exhibition at Congregational Hall, Queen Street, Newton Abbot.

August 20th, 21st, 22nd, 24th, 25th, 26th, 27th, 28th, 29th.—"The Model Engineer" Exhibition at the New Royal Horticultural Hall, Greycoat Street, Westminster, London, S.W.1. Open from 11 a.m. to 9 p.m.

August 20th, 21st, 22nd.—Topsham Model Engineering Society.—Exhibition at the Church Rooms, Ferry Road, Topsham. Opening from 2 p.m. to 9.30 p.m. on the first two days, and from 9 a.m. to 9.30 p.m. on the Saturday.

August 23rd.—Coventry M.E.S.—Regatta at Nauls Park, Coventry.

August 29th, September 1st, 2nd, 3rd, 4th, 5th.—Lincoln Model Engineering Society.—Exhibition at the Technical College, Lincoln.

August 30th.—Model Power Boat Association.—Grand Regatta at Victoria Park, Hackney, E.9.

September 3rd, 4th, 5th.—Southampton and District Society of Model Engineers.—Exhibition at Central Hall, Southampton.

September 6th.—West London Model Power Boat Club.—Regatta at the Round Pond, Kensington Gardens, London.

NOTICES

The Annual Subscription is £2 2s. 0d., post free, to all parts of the world.

The Managing Editor invites correspondence and original contributions on all small power engineering and electrical subjects. Correspondence and manuscripts should not be addressed to individuals, but to the Managing Editor, THE MODEL ENGINEER, 19-20, Noel Street, London, W.1.